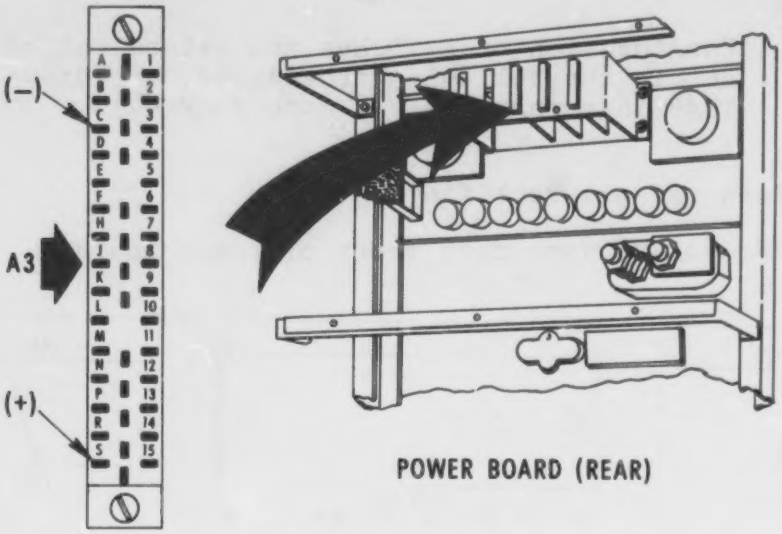
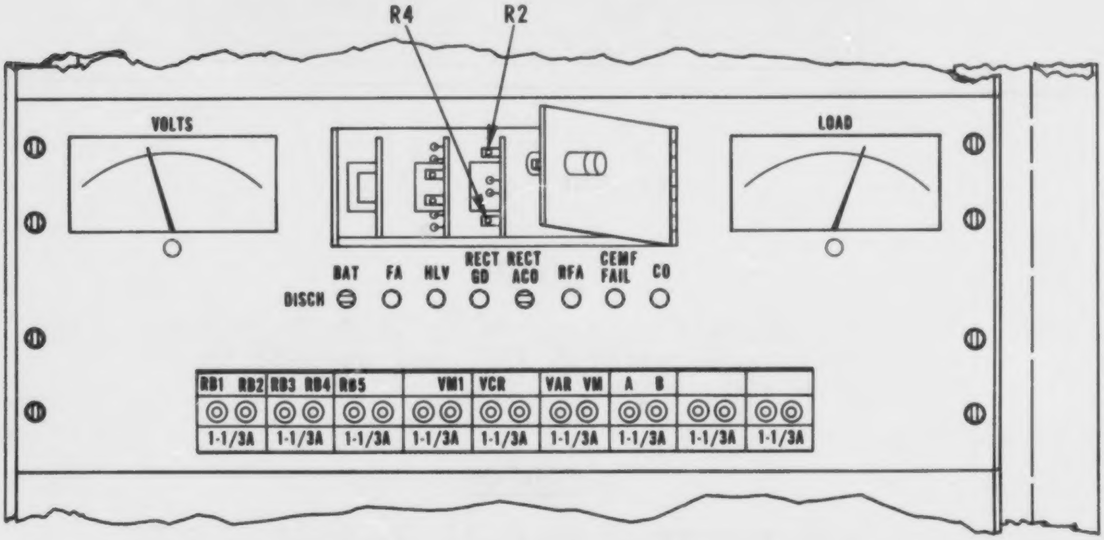
(3) Connect adjustable power supply 6294A (Appendix C) to socket pins C (negative) and S (positive) of circuit card A3.


(–)
A3
(+)
A
B
C
D
E
F
H
J
K
L
M
N
P
R
S
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

POWER BOARD (REAR)

(4) Turn potentiometers R2 and R4 fully counterclockwise.


R4
R2
VOLTS
LOAD
BAT
FA
HLV
RECT GD
RECT ACO
RFA
CEMF FAIL
CO
DISCH
RB1
RB2
RB3
RB4
RB5
VM1
VCR
VAR
VM
A
B
1-1/3A

(5) Use digital multimeter 8600A to set external DC supply voltage to 47.5 VDC.

(6) Listen to relay on circuit card A3. Slowly turn potentiometer R4 clockwise until relay releases. This sets the low limit.

(7) Turn potentiometer R2 fully clockwise.

(8) Set external DC supply voltage to 51.5 VDC.

NOTE

If the adjustment in the following step is missed, the external power supply must be turned off to release relay before another adjustment attempt can be made.

(9) Listen to relay on circuit card A3. Slowly turn potentiometer R2 counterclockwise until relay operates. This sets the high limit.

(10) Remove external DC supply, and replace VCR fuse.

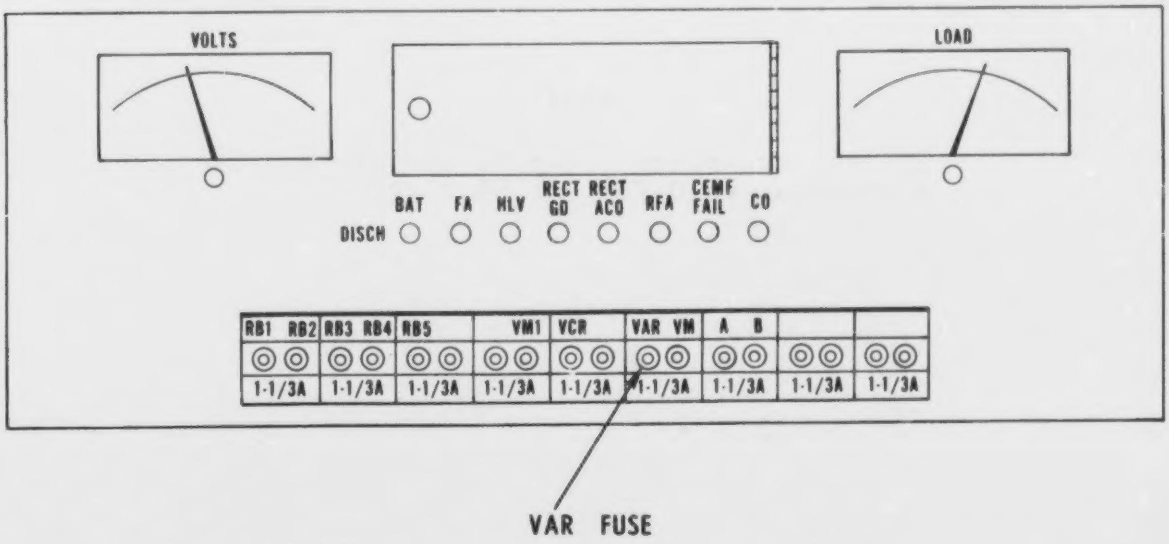
j. Power Board High and Low Voltage Alarm Relay Adjustment.

NOTE

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Turn off all rectifiers.

(2) Remove VAR fuse from front of power board.

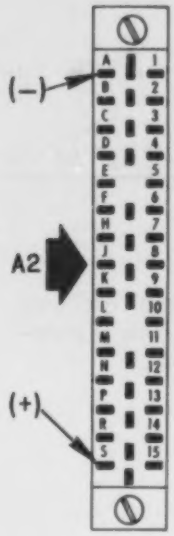

VOLTS
LOAD
BAT
FA
HLV
RECT GD
RECT ACO
RFA
CEMF FAIL
CO
DISCH
RB1
RB2
RB3
RB4
RB5
VM1
VCR
VAR
VM
A
B
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
VAR FUSE

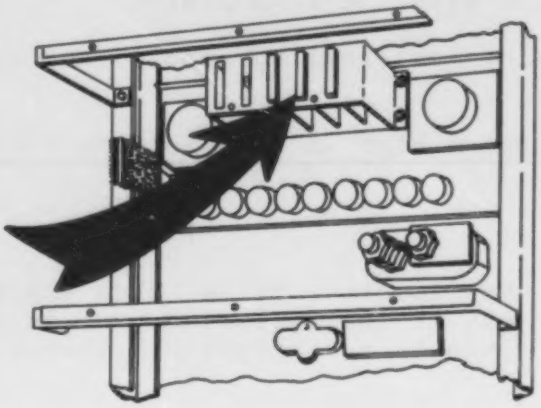
READEX FICHE

CAUTION

When performing step (3), polarity of both DC supply voltage and test voltage connections to voltage sensing circuit is critical. Incorrect polarity will damage the voltage sensing assembly.

(3) Connect adjustable power supply 6294A (Appendix C) to socket pins A (negative) and S (positive) of circuit card A2.



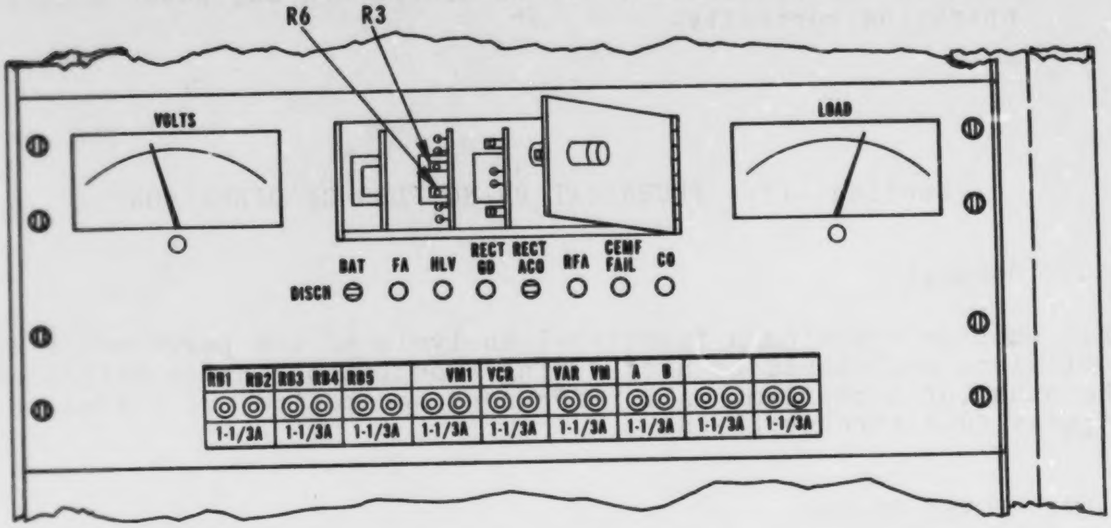


POWER BOARD (REAR

NOTE

The voltage alarm relay is factory set to operate at 46.0 VDC and 56.0 VDC.

(4) Turn potentiometer R3 fully clockwise, and potentiometer R6 fully counterclockwise.


R6
R3
VOLTS
LOAD
BAT
FA
HLV
RECT GD
RECT ACO
RFA
CEMF FAIL
CO
DISCH
RB1
RB2
RB3
RB4
RB5
VM1
VCR
VAR
VM
A
B
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A

(5) Use digital multimeter 8600A to adjust external DC supply voltage to 46.0 VDC.

(6) Listen to relay on circuit card A2. Slowly turn potentiometer R3 counterclockwise until relay releases. This sets the low limit.

(7) Adjust external DC supply voltage to 55.0 VDC.

(8) Listen to relay on circuit card A2. Slowly turn potentiometer R6 clockwise until relay releases. This sets the high limit.

(9) Replace the VAR fuse, and vary power supply between 45.5 VDC and 55.5 VDC. HLV alarm should light at high and low limits.

(10) Remove external power supply.

k. Checking Alarm Circuits.

(1) Check rectifier failure alarm circuit by turning off one rectifier. RFA lamp on power board should light.

(2) Check fuse alarm circuit by removing a good load fuse from power board. FA lamp on power board should light.

1. Final Checks.

Turn on all rectifiers. If no alarms are on, power supply is operating correctly.

Section III. TECHNICAL PRINCIPLES OF OPERATION

5-9. GENERAL.

This chapter contains a functional analysis of the power board and rectifier, and should be used during troubleshooting to help locate the cause of a problem. All referenced schematics are listed as figures FO-1 through FO-18.

5-10. POWER BOARD.

a. Overall Operation. Refer to paragraph 1-25 for a block diagram of the power board.

During normal operation, the battery is connected directly to the load.

During recharging, if battery voltage increases to 51.50 volts, a counter-EMF cell will be inserted into the discharge circuit to decrease DC load voltage.

When battery recharging is completed, the counter-EMF cell is removed from the circuit to prevent the load voltage from decreasing below 47.5 volts.

If load voltage increases to 53 V, or decreases to 46 V, the HLV lamp will light. External alarms are also actuated.

If a power board fuse blows, the FA lamp will light. External alarms are also actuated.

If a rectifier fails, the RFA lamp will light. External alarms are also actuated.

b. High and Low Voltage Control Relay Circuit. The power supply voltage control circuit is made up of a voltage detector circuit and a relay. The voltage being monitored is compared with a constant voltage developed across a zener diode. If the monitored voltage decreases to the low limit setting (47.5 volts) the voltage detector relay will release and will remain released until the monitored voltage increases to the high limit setting (51.5 volts).

5-11. RECTIFIERS.

a. General. Refer to paragraph 1-24 for a block diagram of the rectifier.

b. AC Input Circuit (all models). Commercial AC power is applied through the AC INPUT circuit breaker to the primary of power transformer.

c. Power Circuit (PP-7695/U, PP-7696/U, and PP-7698/U thru PP-7701/U). The six phase star-connected secondary of the power transformer feeds a six phase rectifier. Rectifier power circuits consist of six identical circuits, each having one power diode and one thyristor. Conduction of each thyristor is controlled by a pulse circuit from the regulator and alarm circuit. When a thyristor is not conducting, the power transformer output is supplied through the power diode only. When a higher output voltage is required, a pulse fires each thyristor, causing it to conduct. When the thyristor conducts, an additional winding of the power transformer is inserted into the circuit to increase output voltage. The amount of output voltage added depends on the time the thyristor was fired in relation to the phase of the AC input voltage. The output of each rectifier phase is combined, and applied to the output circuit. The output of the rectifiers is applied to the output circuit, which consists of a DC output filter, an ammeter and shunt, and a DC output fuse. An R-F suppression network is provided at the DC output terminals.

d. Power Circuit (PP-7694/U and PP-7697/U only). A triac, inductor, and capacitor on the 8-11 winding of transformer, and primary transformer winding, control the power output voltage. The length of time the triac is on (phaseback angle) is controlled by a pulse circuit from the regulator and alarm circuit. When the triac is conducting, the inductor is in parallel with the capacitor. A variation in the phaseback angle of firing the triac changes the impedance of this circuit. This change in impedance will cause the current in the 8-11 winding to change in both magnitude and phase, affecting the primary current, and maintaining a constant output voltage. The output of the rectifiers is applied to the output circuit, which consists of a DC output filter, an ammeter and shunt, and a DC output fuse. An R-F suppression network is provided at the DC output terminals.

e. 12 Volt DC Power Supply (all models). The power supply assembly receives AC input from the power circuit, and DC input from the DC output circuit, and outputs regulated -12 volts DC and +12 volts DC.

f. Voltage and Current Regulation Circuit (all models). Voltage and current regulation are controlled by the regulator and alarm circuit. Regulation is by phase control. The circuit monitors the rectifier output, and triggers the triac (or thyristors) in the power circuit. If a triac is triggered early in the AC cycle, the output voltage will decrease. If a triac is triggered late, the output voltage will increase. If a thyristor is triggered early in the AC cycle, the output voltage will increase. If a thyristor is triggered late, the output voltage will decrease.

g. Current Walk-in Circuit (all models). The current walk-in circuit prevents the rapid application of the initial load. A timer circuit provides an 8 second delay from the time the rectifier is started until the full rated output current is available to the load.

h. Load Sharing Circuit (all models). If a paralleled rectifier is supplying more, or less, than its share of the load, the voltage at the load sharing terminal will increase or decrease, and will cause the output current of the rectifier to increase or decrease.

i. Alarm Circuits (all models). The rectifier has a high voltage alarm, a low voltage alarm, a low current alarm, and an overvoltage shutdown circuit. If battery voltage goes high, or low, it is sensed by the alarm circuit, and an LED will light to indicate an alarm condition. The low current, and the overvoltage shutdown circuit sense rectifier output. If the rectifier output current decreases to 1/2% of full rated load, or if the rectifier is turned off, an alarm will light. If the rectifier output voltage reaches the shutdown value, and the rectifier is supplying load current, the AC INPUT circuit breaker will open and turn the rectifier off. When any of the alarms are activated, external alarms will also be activated.

j. Temperature Sensing Circuit (PP-7700/U and PP-7701/U only). Temperature sensing units are mounted on heatsinks in each rectifier. If the temperature of a heatsink reaches +85 degrees C (+185 degrees F), the sensor will open, and rectifier output current will be decreased by one-third. An external alarm will be actuated.

Section IV. TROUBLESHOOTING

5-12. GENERAL.

This section contains the direct support troubleshooting instructions for power supplies PP-7694/U through PP-7701/U. The tests and inspections for each problem should be done in the order given.

5-13. TEST EQUIPMENT.

The following test equipment is used during troubleshooting.

Test Equipment	NSN
Digital Multimeter, 8600A	6625-01-010-0088
Oscilloscope, Dual Trace, R7603 Option 1	6625-00-516-8414
Plug in Unit (Dual Time Base) 7B53A	6625-00-261-5139
Amplifier Dual Channel AM6880/U	6625-00-185-7817
Probe, Switchable, 6062A	6625-00-631-5360

5-14. TROUBLESHOOTING TABLE AND INDEX.

a. Always recheck the results of organizational troubleshooting procedures.

b. Refer to the troubleshooting index below, and locate the PROBLEM. Note the INDEX LETTER for the problem.

c. Find the INDEX LETTER in the PROBLEM column of the troubleshooting table.

d. Follow the steps in the INSPECTION OR TEST column, and take any CORRECTIVE ACTION steps until the problem has been located and corrected.

NOTE

This manual cannot list all problems that may occur, nor everything to check, nor all possible procedures to correct a problem. If a problem is not listed in the table, or is not corrected by the procedures given under CORRECTIVE ACTION, use the technical principles of operation section and the schematics, Figures FO-1 thru FO-18, to locate and correct the problem.

DIRECT SUPPORT TROUBLESHOOTING INDEX

PROBLEM	INDEX LETTER
Power board HLV alarm circuit is faulty.	A
Power board control voltage relay circuit is faulty.	B
Rectifier fan system is faulty (PP-7700/U and PP-7701/U).	C
Rectifier high voltage alarm circuit is faulty.	D
Rectifier low voltage alarm circuit is faulty.	E
Rectifier fuse alarm is on (PP-7699/U and PP-7701/U). No other alarms are on.	F
Rectifier high or low voltage condition (PP-7695/U, PP-7696/U, and PP-7698/U thru PP-7701/U only).	G
Rectifier high or low voltage condition (PP-7694/U and PP-7697/U).	H
Rectifier has failed.	I
Power board fuse alarm circuit is faulty.	J
There is a 300 Hz or 360 Hz noise problem on site.	K

WARNING

Be careful not to contact high voltage input connections (120-415 VDC) when installing or operating this equipment. For additional safety information see warning pages at front of manual.

Maintenance adjustments of these power supplies are made with power applied, be careful when working with this equipment or near the AC input distribution wiring.

Never work on this equipment unless there is another person nearby who is familiar with the operation and hazards of these power supplies. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the AC input power must be shut off before working on the power supply. When working inside a unit with the power off, always ground every part before touching it.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

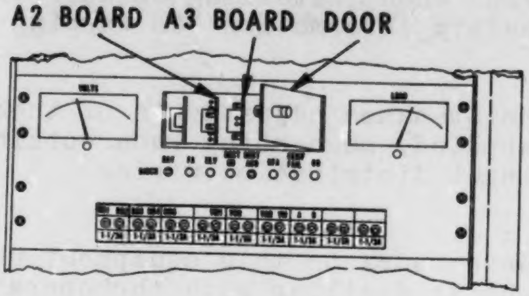
Do not be misled by the term "low voltage". Potentials as low as 48 volts may cause death under adverse conditions. For Artificial Respiration refer to FM 21-11.

NOTE

IF THE EQUIPMENT IS WORKING PROPERLY,
DO NOT MAKE ANY ADJUSTMENTS.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION


A2 BOARD
A3 BOARD
DOOR
VOLTS
LOAD

A. Power board HLV alarm circuit is faulty.

Adjust power board high/low voltage alarm relay (see paragraph 5-8j for procedures). Has problem been corrected?

Yes - end troubleshooting.

No - A2 board is bad. Replace A2 board.

B. Power board control voltage relay circuit is faulty.

Step 1. Adjust high voltage control relay (see paragraph 5-8i for procedures). Has problem been corrected?

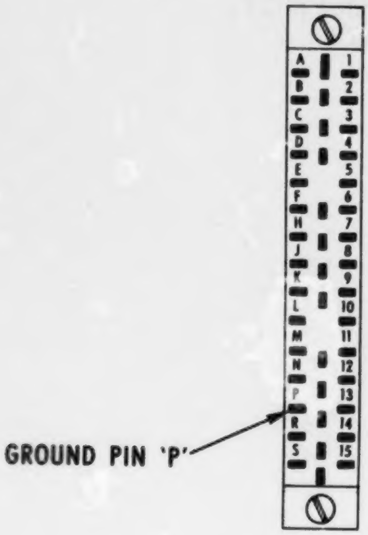
Yes - end troubleshooting.

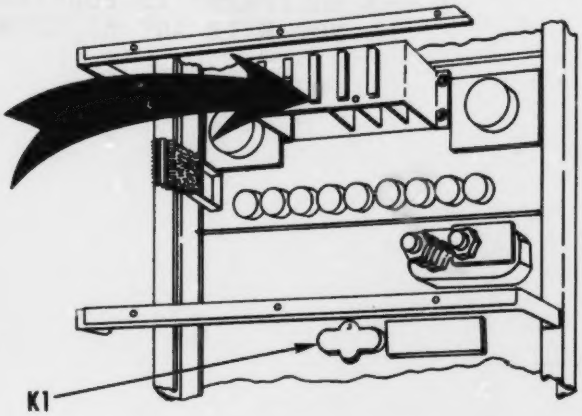
No - go to step 2.

Step 2. Remove A3 board. On back of power board, ground pin P of A3 plug. Does contactor relay K1 operate as ground connection is made? (Listen for it to click.)

Yes - A3 board is bad. Replace A3 board.

No - contactor relay K1 is bad. Replace relay K1.


A
B
C
D
E
F
H
J
K
L
M
N
P
R
S
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
GROUND PIN 'P'

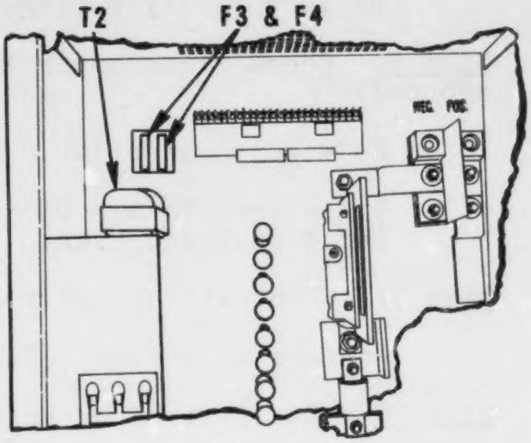


POWER BOARD (REAR)

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

C. Rectifier fan system is faulty (PP-7700/U and PP-7701/U).



Step 1. Is power supply a PP-7701/U model?

Yes - go to step 10.

No - go to step 2.

Step 2. Does transformer T2 have an output voltage?

Yes - go to step 3.

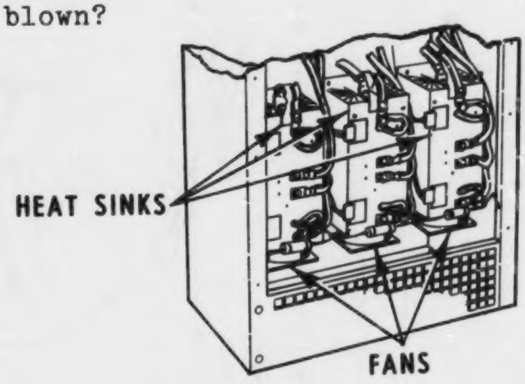
No - go to step 4.

Step 3. One or more fans are faultly.

Replace inoperative fan. End troubleshooting.

WARNING

Heat sinks may still have voltage on them.



Step 4. Has fuse F3 or F4 blown?

No - go to step 7.

Yes - Replace blown fuse. Go to step 5.

Step 5. Did fans start?

Yes - end troubleshooting.

No - go to step 6.

Step 6. Has fuse F3 or F4 again blown?

No - go to step 7.

Yes - go to step 8.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 7. Check AC wiring from input to fan.

Replace faulty wiring. End troubleshooting.

Step 8. Check transformer T2 for shorts. Is transformer shorted?

No - go to step 9.

Yes - transformer T2 is faulty. Replace transformer T2. End troubleshooting.

Step 9. Check wiring and fan motor for shorts.

Replace as needed. End troubleshooting.

Step 10. Has fuse F5 or F6 blown.

No - go to step 13.

Yes - Replace blown fuses. Go to step 11.

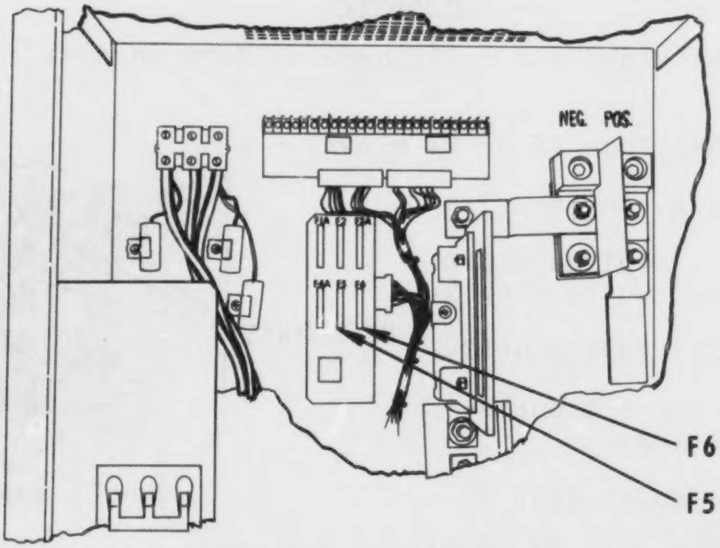


TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 11. Did fans start?

Yes - end troubleshooting.

No - go to step 12.

Step 12. Check wiring and fan motors for shorts. Recheck fuses F5 and F6.

Replace as needed. End troubleshooting.

Step 13. Check AC wiring from input to fan.

Replace faulty wiring. End troubleshooting.

D. Rectifier high voltage alarm circuit is faulty.

Adjust high voltage alarm circuit (see paragraph 5-8j for procedures). Has problem been corrected?

Yes - end troubleshooting.

No - alarm circuitry on control board is bad. Replace control board.

E. Rectifier low voltage alarm circuit is faulty.

Adjust low voltage alarm circuit (see paragraph 5-8j for procedures). Has problem been corrected?

Yes - end troubleshooting.

No - alarm circuitry on control board is bad. Replace control board.

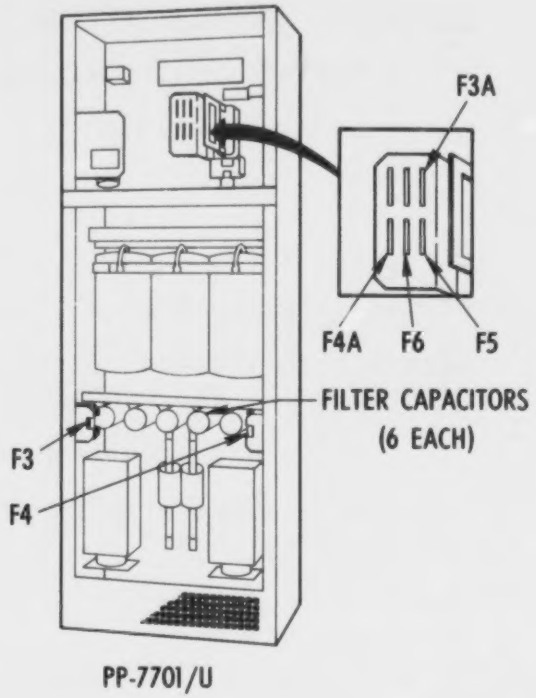
TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
    INSPECTION OR TEST
        CORRECTIVE ACTION

F. Rectifier fuse alarm is on (PP-7699/U and PP-7701/U). No other alarms are on.

NOTE

Only fuse F3 in PP-7699/U, and fuses F3, F4, F5, and F6 in PP-7701/U can blow without any other alarms being on.



PP-7701/U

Step 1. Is power supply a model PP-7699/U?

Yes - go to step 8.

No - go to step 2.

Step 2. Has fuse F5 or F6 blown?

Yes - go to C in this troubleshooting table.

No - go to step 3.

Step 3. Has fuse F3 or F4 blown? (Check at fuse F3A or F4A. If F3A or F4A has blown, F3 or F4 will also have blown.)

No - go to step 7.

Yes - go to step 4.

Step 4. Use digital multimeter to check for voltage between top of fuse F3 and ground, and top of F4 and ground. Is voltage present at both locations?

Yes - go to step 6.

No - go to step 5.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 5. A filter capacitor connected to fuse without voltage is shorted.

Locate and replace shorted filter capacitor (refer to section V for procedures). Replace fuses F3 and F3A, or F4 and F4A as needed. End troubleshooting.

Step 6. Filter capacitors are good. A current surge has blown fuse F3 or F4.

Replace fuses F3 and F3A, or F4 and F4A as needed. End troubleshooting.

Step 7. Fuse alarm circuit is faulty. Check circuit wiring.

Replace or repair faulty wiring. End troubleshooting.

Step 8. Has fuse F3 blown? (Check at fuse F3A. If F3A has blown, F3 will also have blown.)

No - go to step 12.

Yes - go to step 9.

Step 9. Use digital multimeter to check for voltage between top of fuse F3 and ground. Is voltage present?

Yes - go to step 11.

No - go to step 10.

Step 10. A filter capaciator is shorted.

Locate and replace shorted filter capacitor (refer to section V for procedures). Replace fuses F3 and F3A. End troubleshooting.

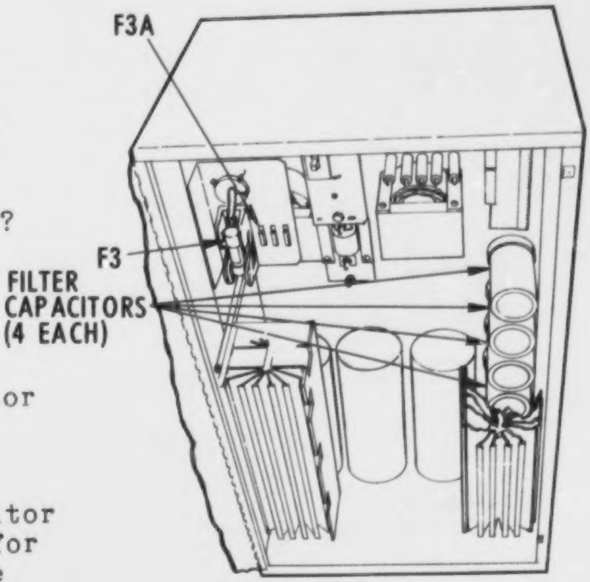


TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 11. Filter capacitors are good. A current surge has blown fuse F3.

Replace fuses F3 and F3A. End troubleshooting.

Step 12. Fuse alarm circuit is faulty. Check circuit wiring.

Replace or repair faulty wiring. End troubleshooting.

G. Rectifier high, or low, voltage condition (PP-7695/U, PP-7696/U, and PP-7698/U thru PP-7701/U only).

Step 1. Be sure that rectifier FLOAT/EQUALIZE switch is in FLOAT.

Step 2. Adjust float voltage (see paragraph 5-8f for procedures. Did it adjust?

Yes - go to step 3.

No - go to step 8.

Step 3. Put rectifier FLOAT/EQUALIZE switch in EQUALIZE, and adjust equalize voltage (see paragraph 5-8g for procedures). Did it adjust?

Yes - go to step 4.

No - go to step 5.

Step 4. Put rectifier FLOAT/EQUALIZE switch back to FLOAT. Did voltage output return to 53 volts?

Yes - end troubleshooting.

No - go to step 5.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 5. Turn off rectifier AC INPUT switch. Use digital multimeter to check continuity (less than one ohm) between the following pins on rectifier terminal board TB3:

WARNING

Voltage is still present at AC INPUT switch. Capacitors inside rectifier may still be charged. For additional safety information refer to warning pages at front of manual.

Pins 4 and 5 (PP-7699/U and PP-7701/U).
Pins 10 and 11 (PP-7695/U, PP-7696/U, PP-7698/U, and PP-7700/U).

Is there continuity?

No - go to step 6.

Yes - go to step 7.

Step 6. Wiring between pins 4 and 5, or 10 and 11 (including the remote sensing switch if attached) is faulty.

Replace or repair faulty wiring. End troubleshooting.

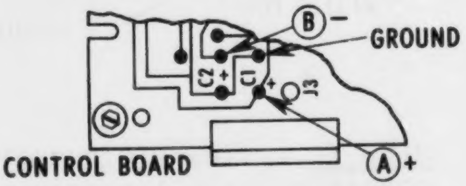
Step 7. Control board is bad.

Replace control board. End troubleshooting.

Step 8. Use digital multimeter to check for +12 volts between point Ⓐ on control board and ground. Is +12 volts present?

Yes - go to step 9.

No - go to step 16.



Step 9. Use digital multimeter to check for -12 volts between point Ⓑ on control board and ground. Is -12 volts present?

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Yes - go to step 10.

No - fuse F2 or associated wiring is faulty. Replace fuse F2 or wiring as needed. End troubleshooting.

NOTE

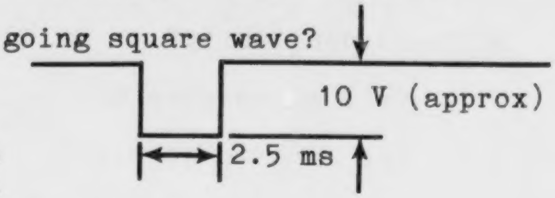
The six trigger boards used in step 10 are located on the heat sinks at the bottom of the rectifier.

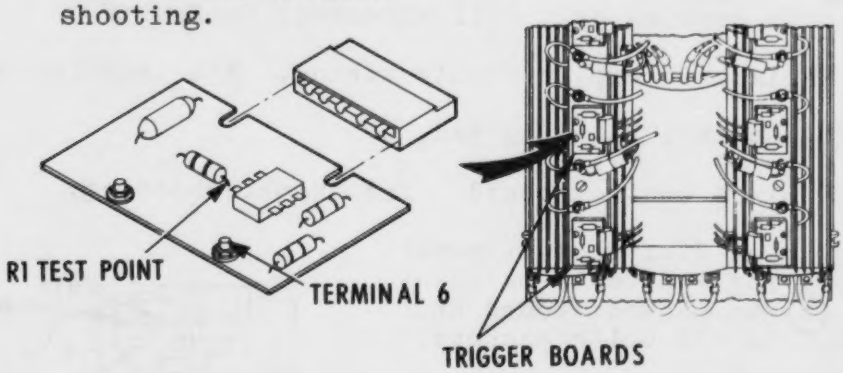
Step 10. Connect oscilloscope channel A to R1 on one trigger board, and to ground. Set oscilloscope as follows: horiz - 2 ms/div, vert - 10 V/div, and trigger source - LINE.

Does scope show a negative going square wave?

Yes - go to step 11.

No - control board is bad. Replace control board. End troubleshooting.





Step 11. Vary FLOAT ADJUST (on front of rectifier) while observing oscilloscope. Does leading edge of square wave move?

Yes - go to step 12.

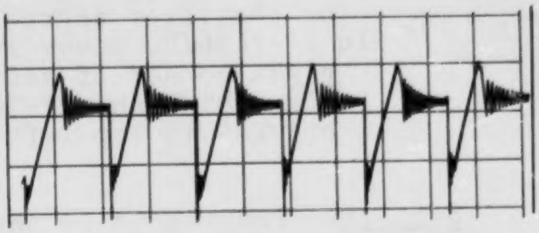
No - control board is bad. Replace control board. End troubleshooting.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

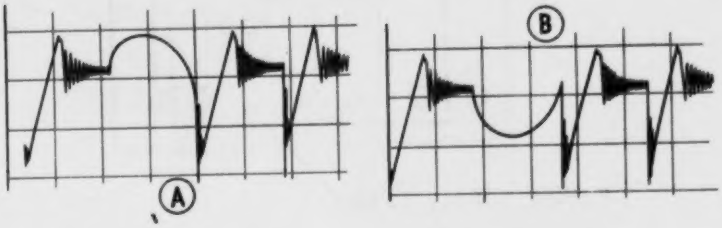
Step 12. Repeat steps 10 and 11 for all six trigger boards. If all trigger boards are good, a SCR is bad. Go to step 13.

Step 13. Move oscilloscope channel A probe to a flange on one heat sink. All scope settings remain the same. Scope pattern should be as shown. Look for a peak that is higher or lower than the rest.



Connect B channel of oscilloscope probe to each trigger board until the square wave matches a bad peak on channel A. SCR associated with that trigger board is not firing. Go to to step 14.

Step 14. The bad peak on channel A should match one of the following patterns.



If peak looks like A , go to step 15.

If peak looks like B , SCR associated with peak is bad. Replace bad SCR. End troubleshooting.

Step 15. Connect B channel of oscilloscope probe to terminal 6 of trigger board associated with the bad peak on channel A. Is a tic mark present on scope pattern?

Yes - SCR is bad.

No - trigger board is bad. Replace trigger board.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

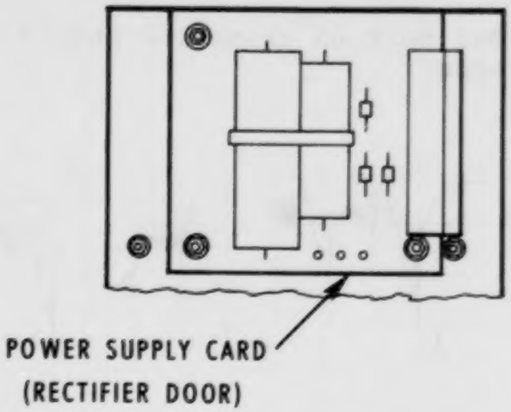
PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

NOTE

In PP-7699/U, PP-7700/U, and PP-7701/U, power supply is on rectifier door.
In PP-7696/U, power supply is on FUSE bracket in top right corner of rectifier.
In PP-7695/U and PP-7698/U, power supply is on FUSE bracket in top left corner of rectifier.

Step 16. Problem is in the power supply. Use digital multimeter to check diodes for open and shorts. If diodes are good, circuit card A8 is bad.

Replace diodes or circuit card A8 as needed.


POWER SUPPLY CARD
(RECTIFIER DOOR)

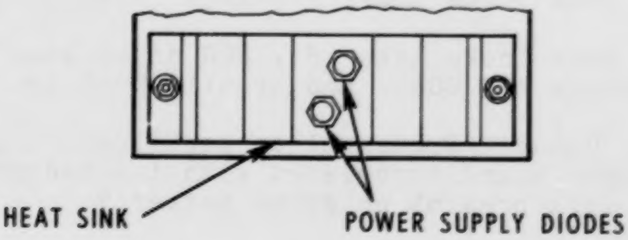

HEAT SINK
POWER SUPPLY DIODES

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

H. Rectifier high, or low, voltage condition (PP-7694/U and PP-7697/U).

Step 1. Be sure that rectifier FLOAT/EQUALIZE switch is in FLOAT.

Step 2. Adjust float voltage (see paragraph 5-8f for procedures). Did it adjust?

Yes - go to step 3.

No - go to step 8.

Step 3. Put rectifier FLOAT/EQUALIZE switch in EQUALIZE, and adjust equalize voltage (see paragraph 5-8g for procedures). Did it adjust?

Yes - go to step 4.

No - go to step 5.

Step 4. Put rectifier FLOAT/EQUALIZE switch back to FLOAT. Did voltage output return to 53 volts?

Yes - end troubleshooting.

No - go to step 5.

Step 5. Turn off rectifier AC INPUT switch. Use digital multimeter to check continuity between pins 4 and 5 on rectifier terminal board TB3. Is the continuity less than one ohm?

No - go to step 6.

Yes - go to step 7.

Step 6. Wiring between pins 4 and 5 (including remote sensing switch if attached) is faulty.

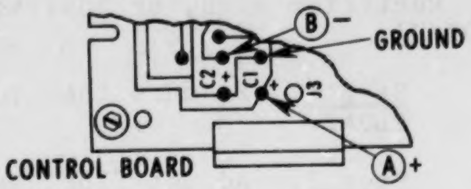
Replace or repair faulty wiring. End troubleshooting.

Step 7. Control board is bad.

Replace control board. End troubleshooting.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
  INSPECTION OR TEST
    CORRECTIVE ACTION



Step 8. Use digital multimeter to check for +12 volts between point Ⓐ on control board and ground. Is -12 volts present?

Yes - go to step 9.

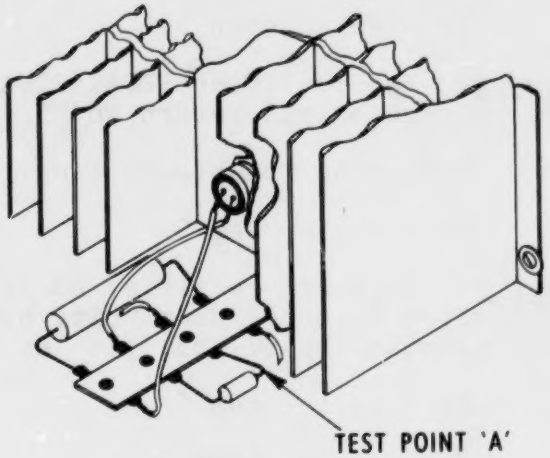
No - go to step 13.

Step 9. Use digital multimeter to check for -12 volts between point Ⓑ on control board and ground. Is -12 volts present?

Yes - go to step 10.

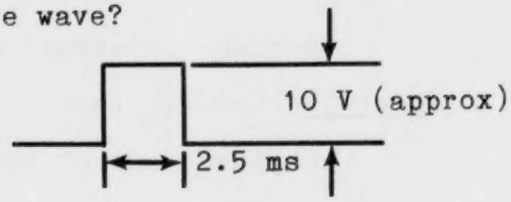
No - fuse F2 or associated wiring is faulty. Replace fuse F2 or wiring as needed. End troubleshooting.

Step 10. Connect oscilloscope channel A to resistor (test point A) and to ground. Set scope as follows: horiz - 2 ms/div, vert - 10 V/div, and trigger source - LINE.



INSIDE RECTIFIER

Does scope show a positive square wave?



Yes - go to step 11.

No - control board is bad. Replace control board. End troubleshooting.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 11. Observe oscilloscope while varing FLOAT ADJUST (on front of rectifier). Does leading edge of signal move?

Yes - go to step 12.

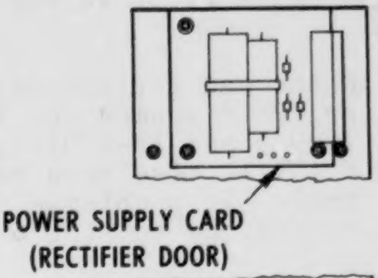
No - control board is bad. Replace control board. End troubleshooting.

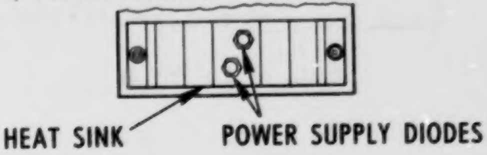
Step 12. Triac is faulty.

Replace triac. End troubleshooting.

Step 13. Problem is in power supply on rectifier door. Check power supply diodes for open and shorts. if diodes are good, circuit card A8 is bad.

Replace diodes or circuit card A8 as needed.





I. Rectifier has failed.

Step 1. Put alarming rectifier AC INPUT circuit breaker and site AC circuit breaker to ON. Did they both stay on?

No - go to step 5.

Yes - go to step 2.

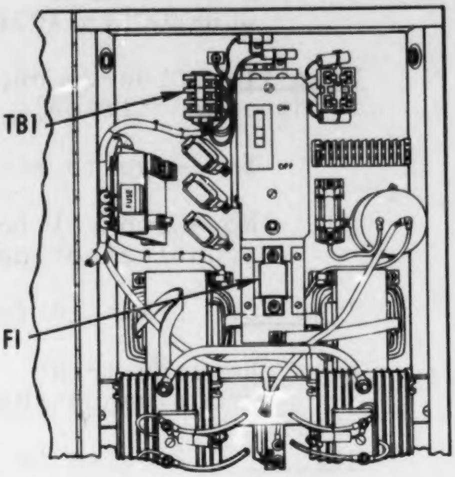
Step 2. Is voltage present at terminal board TB1 (inside rectifier)?

Yes - go to step 3.

No - problem is not in power supply. Locate and correct problem on site. End troubleshooting.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION



RECTIFIER PP-7695/U (TOP)

Step 3. Is there a load on power supply (check at power board LOAD meter)?

Yes - go to step 4.

No - alarm is normal. End troubleshooting.

Step 4. Fuse F1 or F2 may have blown.

Check and replace fuse F1 or F2 if needed (on PP-7699/U and PP-7701/U, fuse F1A will also need replacing). If problem still exists, go to step 6.

Step 5. Only site circuit breaker stays on?

Yes - go to step 9.

No - go to step 6.

Step 6. Pull power board CHARGE FUSE out of alarming rectifier.

WARNING

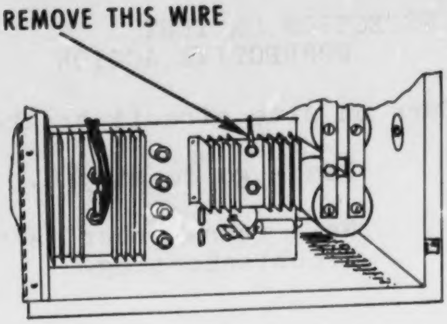
Whenever possible, power to this equipment should be shut off before beginning work. After shutting off power, ground every capacitor likely to hold a dangerous potential. When working inside equipment that has been shut off, always ground every part before touching it. For additional safety information refer to warning pages in front of manual.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

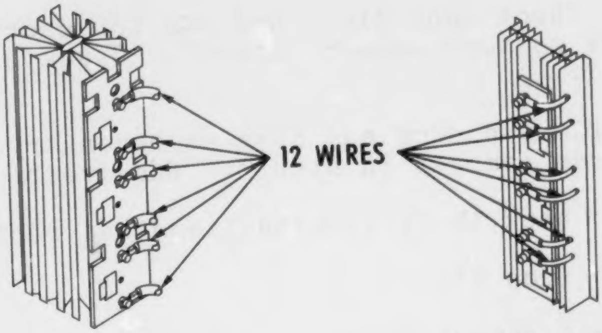
PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 7. Inside rectifier, remove the following wires and diodes:

PP-7694/U and PP-7697/U - Remove and tag one wire.



PP-7695/U, PP-7696/U, PP-7698/U, and PP-7699/U - Remove 12 wires (A1, A2, A4, A5, B1, B2, B4, B5, C1, C2, C4, C5). Be sure all other wires remain on terminals. Tag each wire as removed.



LEFT HEAT SINK
PP-7696/U AND PP-7699/U

LEFT HEAT SINK
PP-7695/U AND PP-7698/U

PP-7700/U and PP-7701/U - Remove 12 wires. Tag each wire as removed. Be sure all other wires remain on terminals.

CAUTION

Be sure that removed wires do not touch terminals, other components, or rectifier frame.

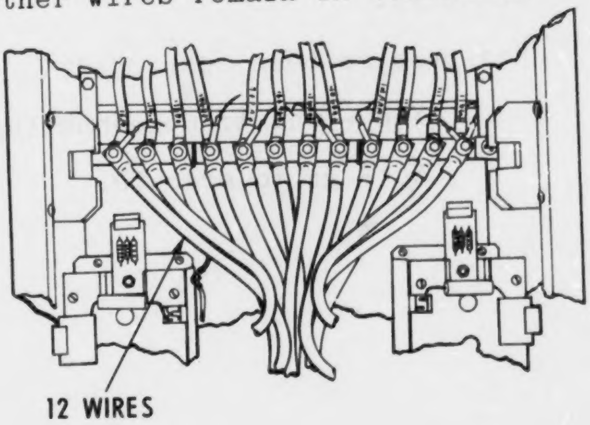


TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Turn on site circuit breaker. Did it stay on?

Yes - go to step 8.

No - transformer is shorted. Replace rectifier. End troubleshooting.

NOTE

Before doing step 8, be sure that battery disconnect switch inside rectifier is open.

Step 8. Check each diode and SCR for shorts by checking from heat sink to terminals of step 7. Check L1 and L2 for shorts to ground.

Replace diodes and SCRs as necessary. Reconnect all wires removed in step 7. End troubleshooting.

Step 9. Check the following items and replace as needed:

Rectifier fuse F1.

Power board charge fuse.

Power board reference battery fuses (RB1, RB2, etc).

Remote sensing wiring (from pins 14 and 15 on J4, thru pins 1 and 2 of TB3, thru power board terminals RG and RB, and to battery).

Has problem been corrected?

Yes - end troubleshooting.

No - go to step 10.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 10. Observe VOLTS meter on alarming rectifier, and try to reset AC INPUT circuit breaker. Is there a meter indication before AC INPUT breaker trips?

Yes - go to step 11.

No - control board is bad. Replace control board. End troubleshooting.

Step 11. Turn rectifier FLOAT ADJUST and EQUALIZE ADJUST fully counterclockwise. Try to reset rectifier AC INPUT circuit breaker. Did it stay on?

Yes - go to step 12.

No - Control board is bad. Replace control board. End troubleshooting.

Step 12. Rectifier is not adjusted correctly.

Adjust FLOAT ADJUST and EQUALIZE ADJUST potentiometers (see paragraph 5-8f and 5-8g for procedures).

J. Power board fuse alarm circuit is faulty.

Check fuse alarm circuit.

Replace or repair fuse alarm circuit wiring as needed.

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
    INSPECTION OR TEST
        CORRECTIVE ACTION

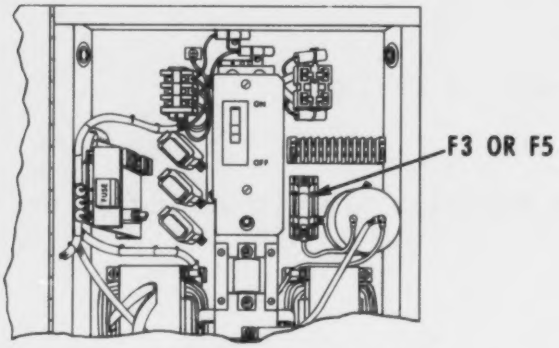
K. There is a 300 Hz or 360 Hz noise problem on site.

NOTE

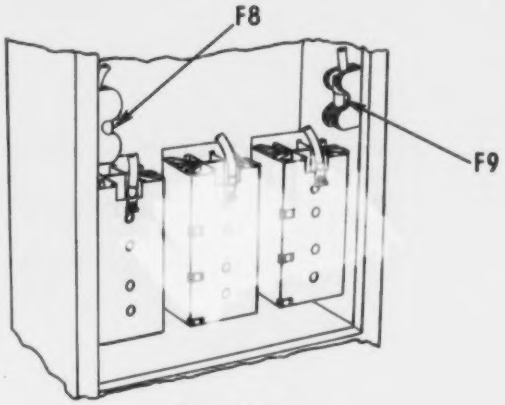
> This manual can not cover all the causes of system noise. The steps below cover only one posibility, and only apply to the six power supplies listed below.

Step 1. Noise can be caused by a blown fuse. If one of the following fuses blown, go to step 2.

PP-7695/U - fuse F3.
PP-7696/U - fuse F5.
PP-7698/U - fuse F3.
PP-7700/U - fuse F8 or F9.
PP-7699/U - fuse F3 (FUSE ALARM will be on. See F in this troubleshooting table.)
PP-7700/U - fuse F8 or F9.
PP-7701/U - fuse F5 or F6 (FUSE ALARM will be on. See F in this troubleshooting table.)



PP-7695/U, PP-7696/U AND PP-7698/U



PP-7700/U

TABLE 5-1. DIRECT SUPPORT TROUBLESHOOTING (continued)

PROBLEM
INSPECTION OR TEST

Step 2. Check for voltage between blown fuse and ground. Is voltage present?

Yes - go to step 4.

No - go to step 3.

Step 3. A filter capacitor connected to the fuse that did not have voltage is shorted.

Locate and replace shorted filter capacitor (Refer to section V for procedures). Replace fuse as needed. End troubleshooting.

Step 4. Filter capacitors are good. A current surge has blown the fuse.

Replace fuse as needed. End troubleshooting.

Section V. DIRECT SUPPORT MAINTENANCE PROCEDURES

5-15. MAINTENANCE OPERATIONS.

Repair of a power supply consists of replacing a defective item with a new or repaired item. For repair parts for these power supplies see TM 11-6130-428-24P/TO 35C1-2-844-4.

5-16. OPERATIONAL CHECKS.

a. Be sure that all operator and organizational maintenance procedures have been performed.

b. Check that power supply meets minimum acceptable quality requiements.

c. Test a newly repaired power supply.

d. Make needed adjustments, and take any action necessary to correct a malfunction.

5-17. INSPECTION PROCEDURES.

a. Always inspect a newly installed or repaired power supply before putting it into operation.

b. Before starting the unit, look it over for any signs of damage. Be sure to look for loose or unconnected wires.

c. After starting, check front panels for alarm lights, and meters for any indications of abnormal operation.

d. Refer to operator's, organizational, and direct support troubleshooting procedures whenever abnormal indications or malfunctions are observed during inspection.

5-18. REPLACEMENT OF COMPONENTS.

NOTE

Most parts in the power supply do not need replacement procedures. Use the general replacement procedures in subparagraph a below for any part not listed in the replacement index.

REPLACEMENT INDEX

Item	Subparagraph
General Replacement Procedures	a
Replacing a Rectifier Triac	b
Replacing a Rectifier Diode or SCR (PP-7695/U and PP-7698/U only)	c
Replacing a Rectifier Diode or SCR (PP-7696/U, and PP-7699/U thru PP-7701/U)	d
Replacing a Rectifier Power Supply Zener Diode or Circuit Card A8	e
Replacing a Rectifier Filter capacitor in PP-7694/U or PP-7697/U	f
Replacing a Rectifier Filter capacitor in PP-7695/U or PP-7698/U	g
Replacing a Rectifier Filter capacitor in PP-7696/U or PP-7699/U	h
Replacing a Rectifier Filter capacitor in PP-7700/U on PP-7701/U	i

WARNING

Whenever possible, power to this equipment should shut off before beginning work. After shuting off power, ground every capacitor likely to hold a dangerous potential. When working inside equipment that has been shut off, always ground every part before touching it. For additional safety information refer to warning pages at front of manual.

a. General Replacement Procedures.

(1) Carefully remove and tag any wires connected to the item.

(2) Remove hardware that holds item in place.

(3) Remove the item, being careful not to damage any other components or wiring.

(4) Fit a new or repaired item in place, and secure it with the correct hardware.

(5) Reattach any wires removed from the unit. Make sure all connections are tight, and all solder joints are secure.

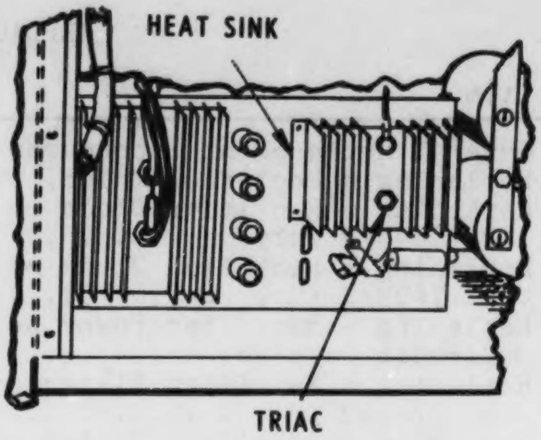
b. Replacing a Rectifier Triac.

(1) Unsolder and tag wires attached to triac.

(2) Remove the three screws holding heat sink in place.

(3) From back of heat sink, unbolt and replace triac.

(4) Reattach heat sink, and resolder wires to triac.



BOTTOM FRONT OF PP-7694/U.

c. Replacing a Rectifier Diode or SCR (PP-7695/U and PP-7698/U only).

(1) Remove the two screws ① holding trigger board assembly to heat sink.

(2) Remove the four screws ② holding heat sink assembly in place, and swing the complete assembly up and out.

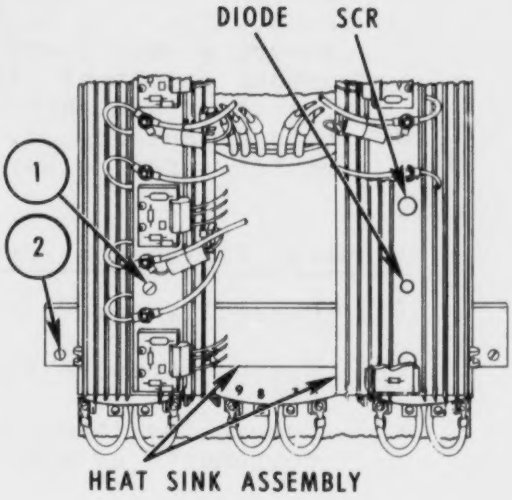
(3) From back of heat sink, unbolt and remove faulty diode or SCR.

(4) Remove wires from diode or SCR, and reattach them to new diode or SCR.

(5) Install new diode or SCR in place in heat sink.

(6) Reinstall heat sink assembly in rectifier.

(7) Reattach trigger board to heat sink.



d. Replacing a Rectifier Diode or SCR (PP-7696/U, and PP-7699/U through PP-7701/U).

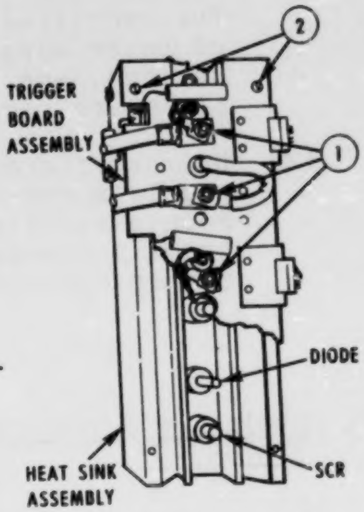
(1) Remove the four screws holding heat sink to rectifier.

(2) Unbolt the six large wires ① that go through the six holes in trigger board assembly.

(3) If an SCR is being replaced, unbolt the two small wires that go through hole in trigger board assembly and to the faulty SCR.

(4) Remove the four screws ② holding trigger board assembly to heat sink. Gently move trigger board assembly out of the way.

(5) From back of heat sink, unbolt and remove faulty diode or SCR.



(6) If a diode is being replaced, remove wire attached to it.

(7) Reinstall new diode or SCR in place in heat sink.

(8) Fit wires from diode or SCR through hole in trigger board assembly.

(9) Reattach trigger board assembly to heat sink.

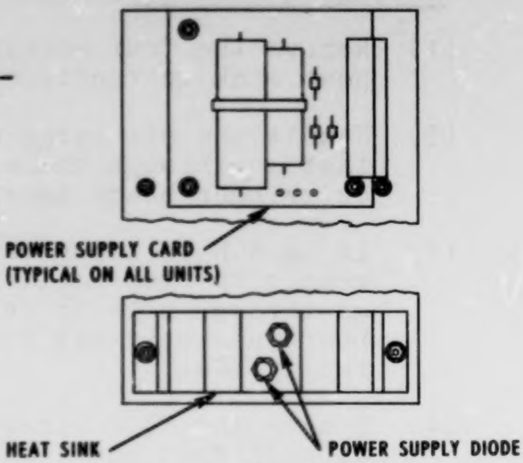
(10) Reattach all wires to trigger board assembly.

(11) Reattach heat sink to rectifier.

e. Replacing a Rectifier Power Supply Zener Diode or Circuit Card A8.

(1) Replacement procedures for rectifier door mounted power supplies are obvious, and no instructions are needed.

(2) On rectifiers with power supply mounted inside, remove mounting bracket to gain access to power supply components.



f. Replacing a Rectifier Filter Capacitor in PP-7694/U or PP-7697/U.

(1) Remove and tag all wires ① attached to connecting bars.

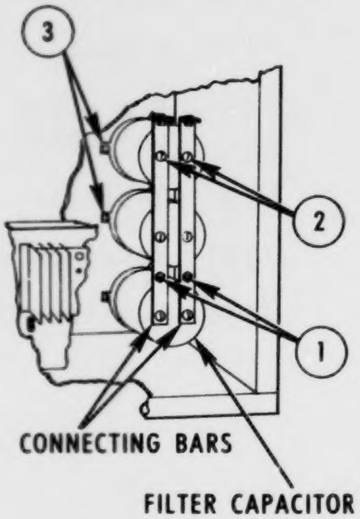
(2) Remove the six screws ② holding connecting bars to top of capacitors. Remove connecting bars.

(3) Locate faulty capacitor (check each one for shorts and open).

(4) Remove the three screws ③ attaching faulty capacitor to back of rectifier. Remove capacitor.

(5) Loosen mounting clamp screw holding clamp to base of capacitor. Remove mounting clamp.

(6) Replace mounting clamp on new capacitor. Be sure screw holes on top of capacitor line up correctly, and secure clamp screw.

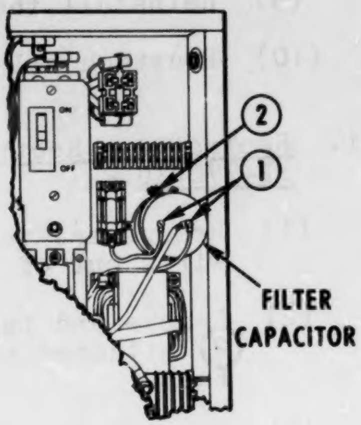


(7) Fit new capacitor in rectifier, and secure it in place.

(8) Reinstall connecting bars.

(9) Reattach all wires to connecting bars.

g. Replacing a Rectifier Filter Capacitor in PP-7695/U or PP-7698/U.



(1) Remove and tag all wires ① attached to capacitor.

(2) Loosen mounting clamp screw ② at base of capacitor.

(3) Remove capacitor and replace it with a new one.

(4) Secure mounting clamp screw.

(5) Reattach all wires to capacitor.

h. Replacing a Rectifier Filter Capacitor in PP-7696/U or PP-7699/U.

(1) Remove the four screws holding the right side heat sink in place, and swing it out of the way.

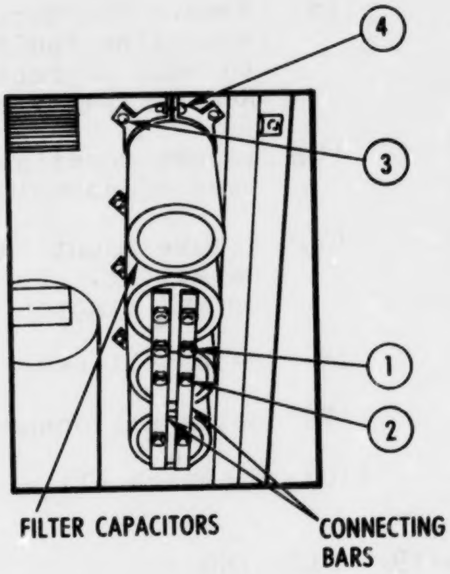
(2) Remove and tag all wires ① attached to connecting bars on lower three capacitors.

(3) Remove the six screws ② holding connecting bars to top of capacitors. Remove connecting bars.

(4) Locate faulty capacitor (check each one for shorts and open).

(5) Remove the three screws ③ attaching faulty capacitor to back of rectifier. Remove faulty capacitor.

(6) Loosen mounting clamp screw ④ holding mounting clamp to base of capacitor.



(7) Remove mounting clamp, and install it in place on new capacitor. Be sure that holes on top of capacitor line up, and tighten mounting clamp screw.

(8) Reinstall new capacitor in place in rectifier.

(9) Reinstall the two connecting bars.

(10) Reattach all wires to connecting bars.

i. Replacing a Rectifier Filter Capacitor in PP-7700/U or PP-7701/U.

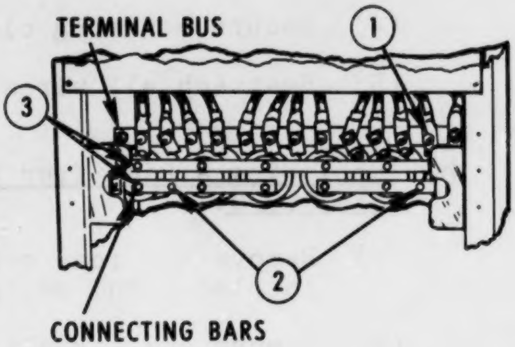
(1) Remove and tag all wires ① on terminal bus. Secure wires out of the way.

(2) Remove and tag all wires ② attached to connecting bars.

(3) Remove screws ③ attaching connecting bars to capacitors. Remove connecting bars.

(4) Locate faulty capacitor (check each one for shorts and open).

(5) Remove the three screws attaching faulty capacitor to back of rectifier. Remove faulty capacitor.



(6) Loosen mounting clamp screw holding mounting clamp to base of capacitor.

(7) Remove mounting clamp, and install it in place on new capacitor. Be sure that holes on top of capacitor line up and tighten mounting clamp screw.

(8) Reinstall new capacitor in place in rectifier.

(9) Reinstall connecting bars.

(10) Reattach all wires to connecting bars and terminal buss.

5-19. CLEANING.

Refer to cleaning procedures, paragraph 4-11.

5-20. ACCEPTANCE/REJECTION CRITERIA.

Acceptance/rejection criteria for the power supply is used to determine that new/or repaired items meet a minimum performance standard when in operation. If no alarms are on, and site load is operating, the power supply is acceptable for service.

5-21. PAINTING.

Refer to painting procedures, paragraph 4-14.

5-22. ADJUSTING A REPAIRED POWER SUPPLY.

NOTE

All adjustments have been factory set, and may not require further adjusting.

If adjustment is required refer to the paragraphs listed below.

Adjustment	Paragraph
Rectifier Current Limit Adjustment.	5-8b
Rectifier Operating Range Adjustment.	5-8c
Rectifier High and Low Voltage Alarm Adjustment.	5-8d
Rectifier Overvoltage Adjustment.	5-8e
Rectifier Battery Float Voltage Adjustment.	5-8f
Rectifier Equalize Voltage Adjustment.	5-8g
Rectifier Load Sharing Adjustment.	5-8h
Power Board High and Low Voltage Control Relay Adjustment.	5-8i
Power Board High and Low Voltage Alarm Relay Adjustment	5-8j

5-23. TESTING A REPAIRED POWER SUPPLY.

A repaired power supply is tested by putting it into operation, and watching for alarms or signs of faulty operation. If no alarms come on, and site load is operating, power supply has been repaired correctly.

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

5-24. PACKING.

CAUTION

> On power supplies with two rectifiers mounted in the same rack, the rack will bend if rectifiers are turned horizontal without adequate support. Make sure that both rectifiers are adequately supported when crated.

Packing of a power supply for shipment or limited storage normally will be performed at a packing facility, or by a repacking team. Should emergency packing be needed, select materials from those listed in SB 38-100, and pack the power supply in a cleated wooden plywood box. Use adequate bracing, cushioning, and wrapping to protect the unit from damage. If power supply must be shipped, it should be packed so that exterior shipping containers will meet common carrier acceptance, and will provide safe delivery to the destination.

5-25. MARKING.

Mark the shipping box with the information below. Use any lettering means that will provide legibility and durability.

a. National Stock Number.

b. Quantity and unit of issue.

c. Contract, purchase order, or delivery order number.

d. Additional markings as required by the commanding officer.

Exterior shipping containers shall be marked with delivery address. Also put address in an envelope and attach it to outside of box, or place it inside box.

One copy of each shipping document shall be put in an envelope and attached to outside of box, or placed inside box.

5-26. ADMINISTRATIVE STORAGE.

Short term storage (less than 45 days) equipment must be able to be readied for mission performance within 24 hours. Before placing an item in administrative storage, the next scheduled preventive maintenance checks and services should be performed, all known deficiencies corrected, and all current modification work orders applied. Tne administrative storage site should provide protection from the elements, and allow access for visual inspection.

CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

6-1. This chapter currently not applicable.

APPENDIX A

REFERENCES

A-1. SCOPE.

This appendix lists forms and publications that are referenced in this manual, or that contain information applicable to the operation and maintenance of a power supply.

A-2. FORMS.

AFTO Form 22	Technical Order System Publication Improvement Report and Reply.
DA Form 2028	Recommended Changes to Publications and Blank Forms.
SF 361	Discrepancy in Shipment Report.
SF 364	Report of Discrepancy
SF 368	Quality Deficiency Report

A-3. ARMY PUBLICATIONS.

AR 55-38	Reporting of Transportation Discrepancies in Shipment.
AR 735-11-2	Reporting of Item and Packaging Discrepancies.
DA PAM 310-1	Consolidated Index of Army Publications and Blank Forms
DA PAM 738-750	Maintenance Management Update
DA PAM 750-10	US Army Equipment Index of Modification Work Orders.
SB 11-573	Painting and Preservation Supplies Available for Field use for Electronics Command Equipment.
SB 38-100	Preservation, Packaging, Packing, and Marking Materials, Supplies and Equipment used by the Army.

TM 11-6130-428-24P/ TO 35C1-2-844-4	Organizational, Direct Support, and General Support Repair Parts and Special Tools List for Power Supplies PP-7694/U, PP-7695/U, PP-7696/U, PP-7697/U, PP-7698/U, PP-7699/U, PP-7700/U, and PP-7701/U.
TM 750-244-2	Procedures for Destruction of Electronic Material to Prevent Enemy Use (Electronics Command).

A-4. AIR FORCE PUBLICATIONS.

TO. 00-35D54	Material Deficiency Reporting.
TO. 00-5-1	Technical Order Distribution and Publications.
TO 35C1-2-844-6WC-1	Scheduled Periodic Inspection Work Cards for Power Supplies PP-7694/U thru PP-7701/U.

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

B-1. SCOPE.

This appendix lists components of end item and basic issue items for these power supplies to help you inventory items required for safe and efficient operation.

B-2. GENERAL.

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transfered between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place a power supply in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the power supply during operation and whenever it is transfered between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS.

The following is an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustaration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National stock number assigned to the item, and will be used for requisitioning purposes.

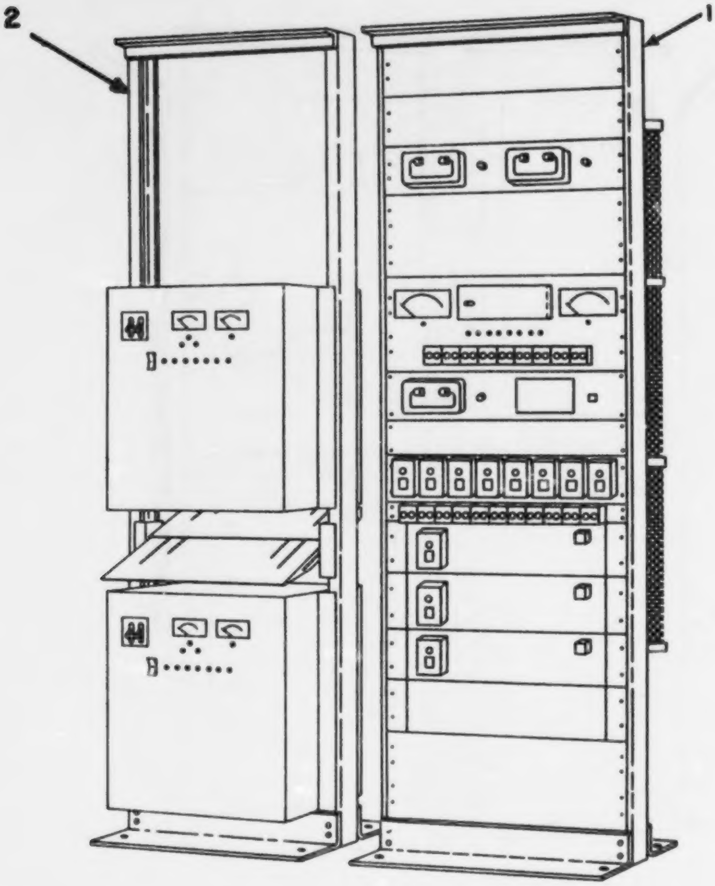
c. Column (3) - Description. Indicates the Federal item name and, if required, a minumum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM

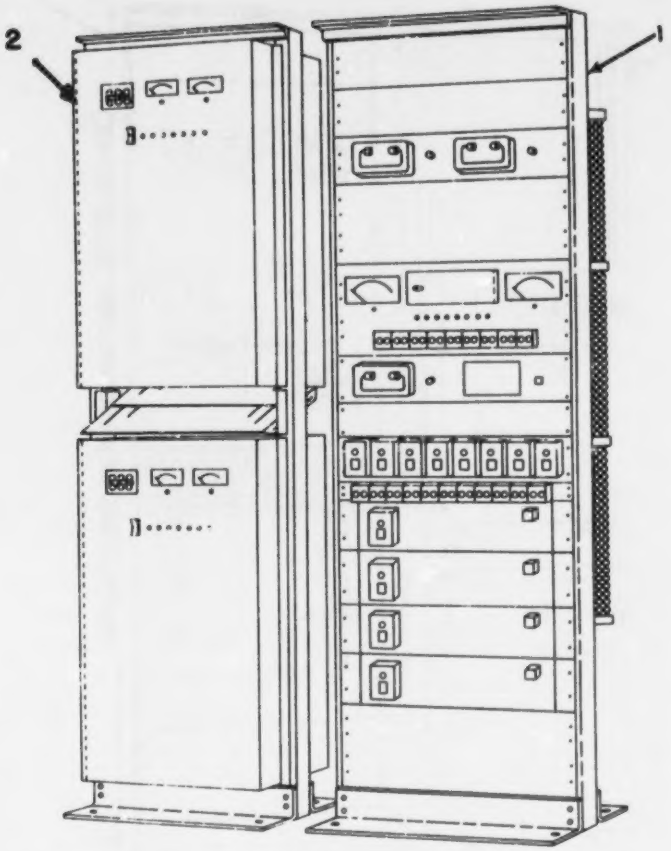
Components of End Item - PP-7694/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST1	FAS	EA	1
2	6130-01-174-7348	Rectifier Assembly RL50F50 (74006) 5431-025	FAS	EA	2

COMPONENTS OF END ITEM - Continued

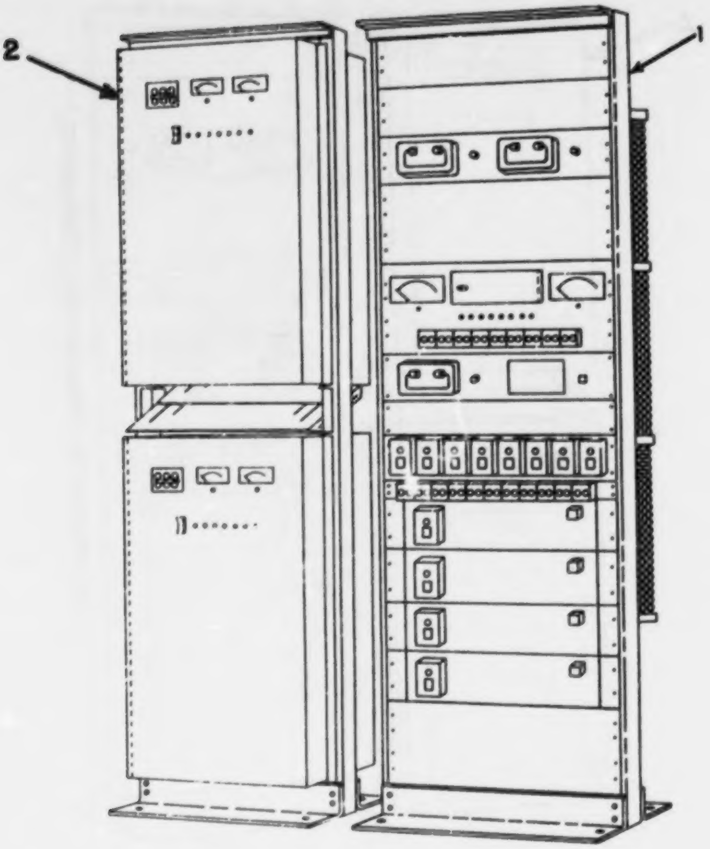
Components of End Item - PP-7695/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST2	FAT	EA	1
2		Rectifier Assembly RHM100C50 (74006) 5457-005	FAT	EA	2

COMPONENTS OF END ITEM - Continued

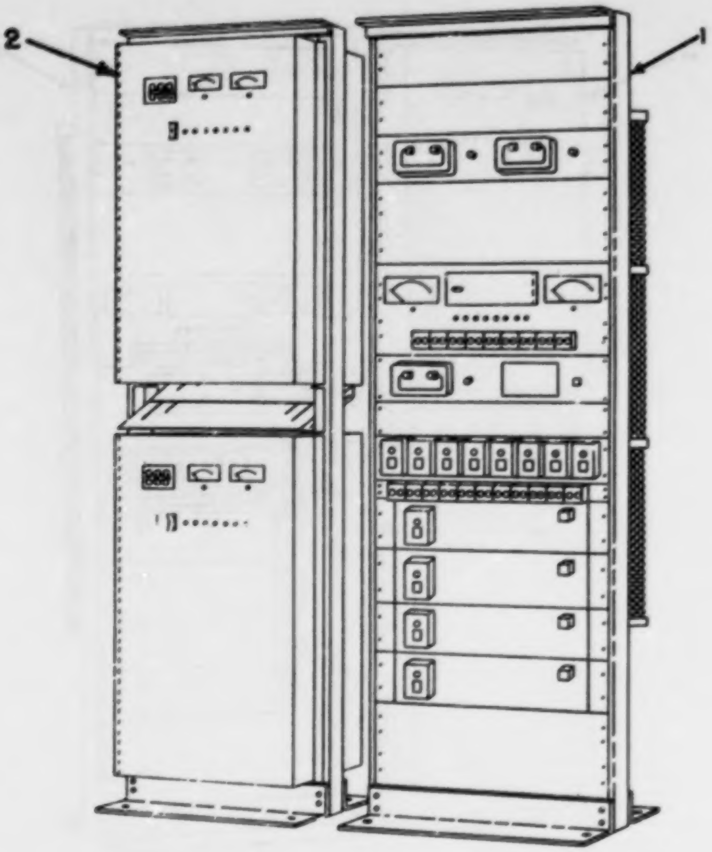
Components of End Item - PP-7696/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST3	FAU	EA	1
2		Rectifier Assembly RHM200C50 (74006) 5475-010	FAU	EA	2

COMPONENTS OF END ITEM - Continued

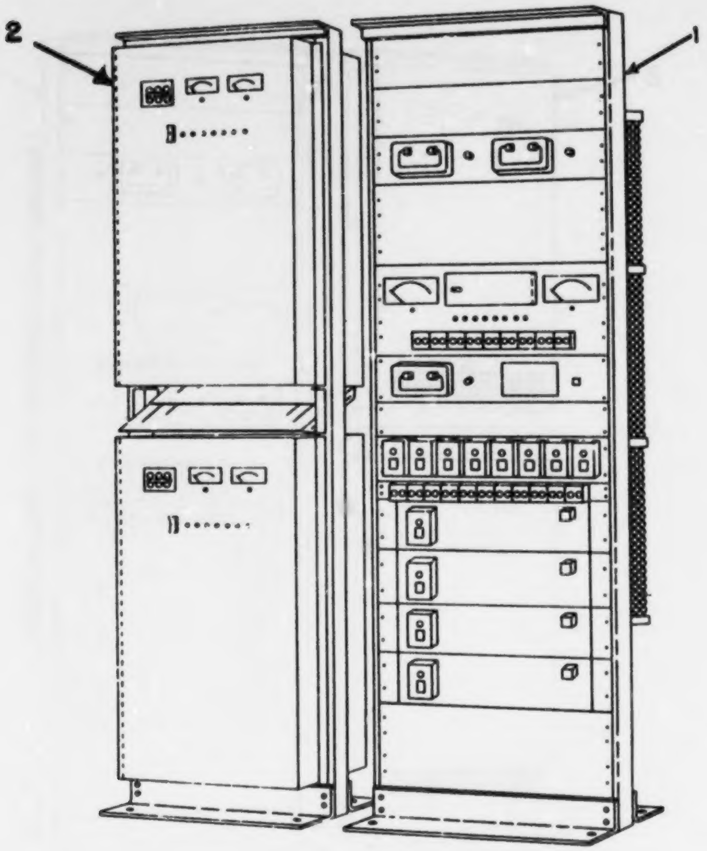
Components of End Item - PP-7697/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST4	FAV	EA	1
2		Rectifier Assembly RL100F50 (74006) 5452-009	FAV	EA	2

COMPONENTS OF END ITEM - Continued

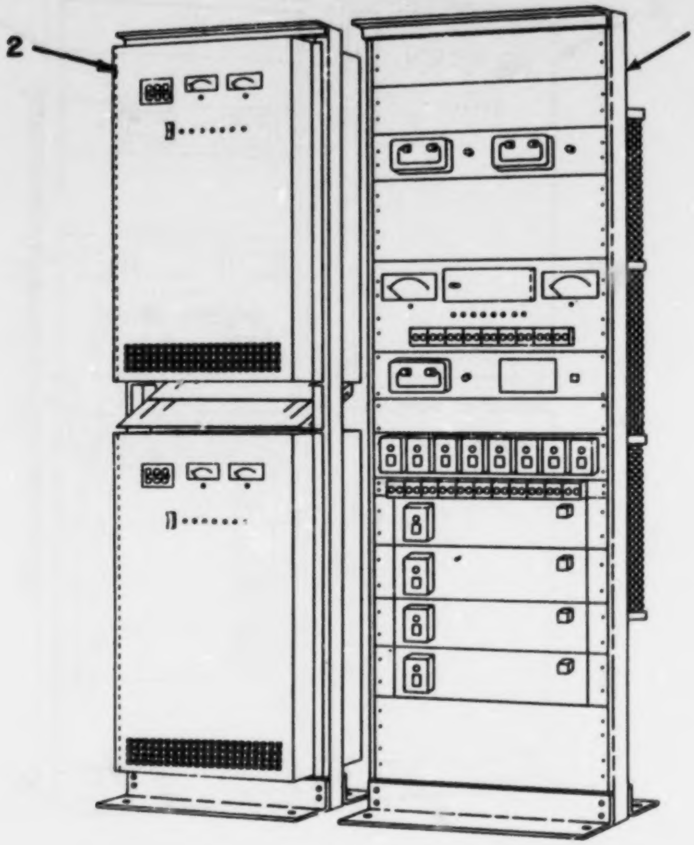
Components of End Item - PP-7698/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST5	FAW	EA	1
2		Rectifier Assembly RHM100D50 (74006) 5454-009	FAW	EA	2

COMPONENTS OF END ITEM - Continued

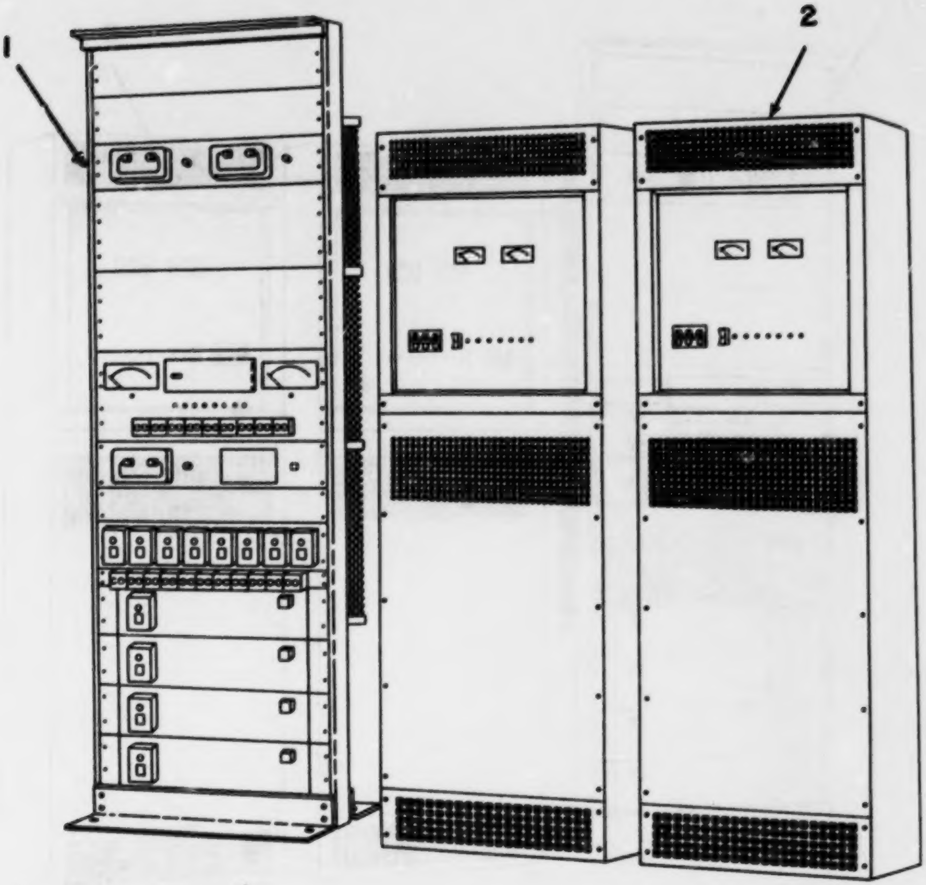
Components of End Item - PP-7699/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST6	FAX	EA	1
2		Rectifier Assembly RHM200D50 (74006) 5472-013	FAX	EA	2

COMPONENTS OF END ITEM - Continued

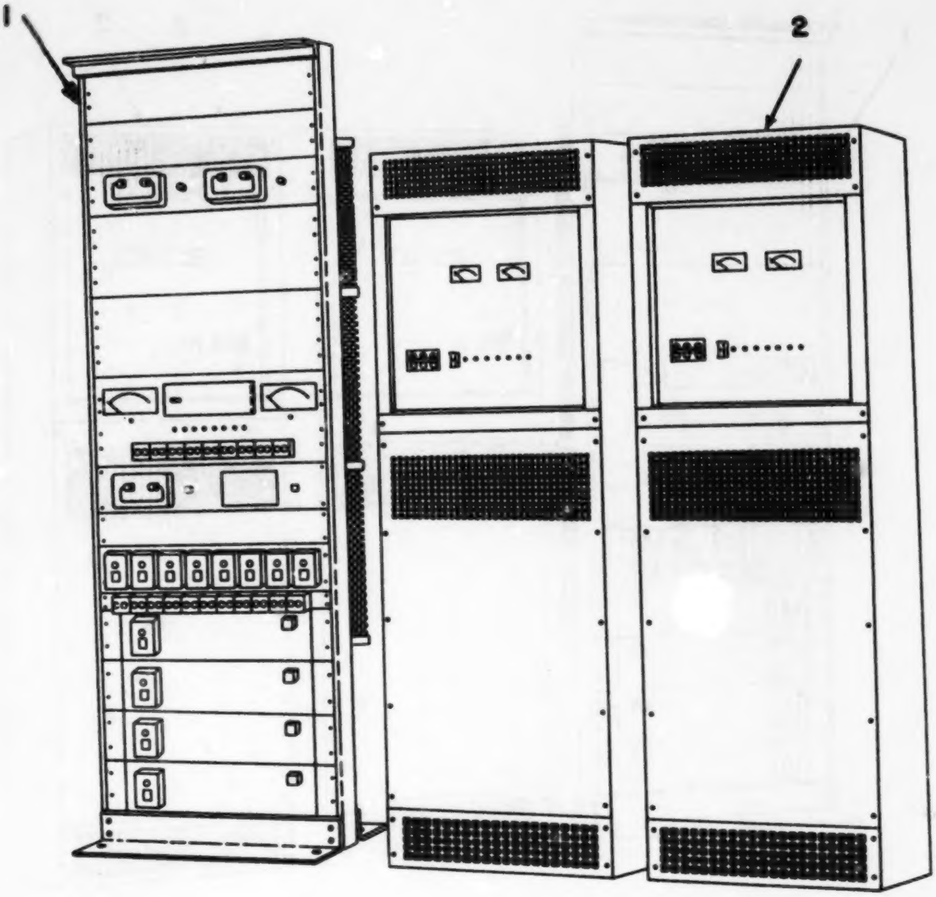
Components of End Item - PP-7700/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST7	FAY	EA	1
2		Rectifier Assembly RHM400C50 (74006) 5482-017	FAY	EA	2

COMPONENTS OF END ITEM - Continued

Components of End Item - PP-7701/U



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1		Power Board Assembly (74006) 1232F2LIST8	FAZ	EA	1
2		Rectifier Assembly RHM400D50 (74006) 5481-034	FAZ	EA	2

Section III. BASIC ISSUE ITEMS

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
	TM 11-6130-428-14 TO 35C1-2-844-1	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Power Supplies PP-7694/U, PP-7695/U, PP-7696/U, PP-7697/U, PP-7698/U, PP-7699/U, PP-7700/U, and PP-7701/U			1
	TM 11-6130-428-24P TO 35C1-2-844-4	Organizational, Direct Support, and General Support Repair Parts and Special Tools List for Power Supplies PP-7694/U, PP-7695/U, PP-7696/U, PP-7697/U, PP-7698/U, PP-7699/U, PP-7700/U, and PP-7701/U			1

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

SECTION I. INTRODUCTION

C-1. SCOPE

This appendix lists additional items you are authorized for the support of these power supplies.

C-2. GENERAL

This list identifies items that do not have to accompany these power supplies and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type of document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

SECTION II. ADDITIONAL AUHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION FSCM & PART NUMBER USABLE ON CODE	(3) U/M	(4) QTY AUTH
6140-00-922-0918	For 50 amp power supplies: Battery, 24 Cell, 48V, 270AH, Lead Calcium Cell Dry Chgd, KCT-270DC (80531)	EA	1
6140-00-156-4009	For 100 amp power supplies: Battery, 24 Cell, 48V, 540AH, Lead Calcium Cell Dry Chgd, KCT-540DC (80531)	EA	1
	For 200 amp power supplies: Battery, 24 Cell, 48V, 1008AH, Lead Calcium Cell Dry Chgd, LCT-1008DC (80531)	EA	1
6140-01-165-8477	For 400 amp power supplies: Battery, 24 Cell, 48V, 2016AH, Lead Calcium Cell Dry Chgd, LCT-2016DC (80531)	EA	1
6630-00-580-4884	Tester, Battery, PL-520 (08531)	EA	1
6130-01-062-6739	Power Supply, 0-60 VDC at 1 amp, 6294A (28480)	EA	1
	Test Load, 48 V at 200 amps, Plushoto LB 6-24-200	EA	1
6658-00-803-6421	Thermometer, Self-indicating, liquid in glass, PL-644 (80531)	EA	1
5120-00-198-5406	Key, Socket Head Screw, 3/8 inch, GGG-K-275 (81348)	EA	1

APPENDIX D

MAINTENANCE ALLOCATION CHART

SECTION I. INTRODUCTION

D-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

D-2. Maintenance Functions. Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnositic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seting, or fixing into position a spare, repair part, or module (component or asssembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3d position code of the SMR code.

i. Repair. The application of maintenance services., including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

D-3. Explanation of Columns in the MAC, Section II.

a. Column (1), Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00".

b. Column (2), Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column (3), Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragaph D-2.)

d. Column (4), Maintenance Catagory. Column 4 specifies, by the listing of a worktime figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate worktime figures will be shown for each category. The worktime figure represents the average time required to restore an item (assembly, subassembly, component, module, end item , or system to a servicable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart The symbol designations for the various maintenance categories are as follows:

C	Operator or crew
O	Organizational maintenance
F	Direct Support Maintenance
H	General Support Maintenance
L	Specialized Repar Activity (SRA)
D	Depot maintenance

e. Column (5), Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column (6), Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

D-4. Explanation of Columns in Tool and Test Equipment Requirements, Section III.

a. Column (1), Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column (2), Maintenance Catagory. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column (3), Nomenclature. Name or identification of the tool or test equipment.

d. Column (4), National stock Number. The National stock number of the tool or test equipment.

e. Column (5), Tool Number. The manufacturer's part number.

D-5. Explanation of Columns in Remarks, Section IV.

a. Column (1), Reference code. The code recorded in column 6, Section II.

b. Column (2), Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART FOR POWER SUPPLIES PP-7694/U THROUGH PP-7701/U

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINT FUNCTION	(4) MAINT CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
00	48 V POWER SUPPLY PP-7694/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			2.0			1 thru 7	B
	48 V POWER SUPPLY PP-7695/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			2.4			1 thru 7	B
	48 V POWER SUPPLY PP-7696/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			3.0			1 thru 7	B
	48 V POWER SUPPLY PP-7697/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			2.0			1 thru 7	B
	48 V POWER SUPPLY PP-7698/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			2.0			1 thru 7	B

Section II. MAINTENANCE ALLOCATION CHART FOR POWER SUPPLIES PP-7694/U THROUGH PP-7701/U

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINT FUNCTION	(4) MAINT CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
	48 V POWER SUPPLY PP-7699/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			3.0			1 thru 7	B
	48 V POWER SUPPLY PP-7700/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			3.0			1 thru 7	B
	48 V POWER SUPPLY PP-7701/U	Inspect	0.1						
		Test			0.1			2	
		Service		0.1					A
		Adjust			1.0			1,2	
		Install			3.0			1,8	
		Repair			3.0			1 thru 7	B
01	POWER BOARD ASSEMBLY (1232F2, LIST 1 THRU 8)	Inspect	0.1						
		Test			0.7			2,4,5 6,7	
		Service		0.1					A
		Adjust			0.5			1,2	
		Repair			1.5			1	
0101	FUSE PANEL ASSEMBLY 4318-405	Inspect			0.1				
		Test			0.1			2	
		Repair	0.1					1	C
		Repair			2.0			1,2	
		Replace			1.0			1	

Section II. MAINTENANCE ALLOCATION CHART FOR POWER SUPPLIES PP-7694/U THROUGH PP-7701/U

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINT FUNCTION	(4) MAINT CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
0102	FUSE PANEL ASSEMBLY 4317-008	Inspect			0.1				C
		Test			0.1			2	
		Repair	0.1					1	
		Repair			2.0			1,2	
		Replace			1.0			1	
0103	FUSE PANEL ASSEMBLY 4314-009	Inspect			0.1				C
		Test			0.1			2	
		Repair	0.1					1	
		Repair			2.0			1,2	
		Replace			1.0			1	
0104	FUSE PANEL ASSEMBLY 4316-002	Inspect			0.1				C
		Test			0.1			2	
		Repair	0.1					1	
		Repair			2.0			1,2	
		Replace			1.0			1	
0105	CEMF CELL PANEL ASSEMBLY	Inspect		0.1					D,E
		Inspect			0.1				
		Test			0.5			2	
		Repair			3.5			1,2,3	
		Replace			1.0			1	
0106	CONTACTOR PANEL	Inspect			0.1				
		Test			0.5			2	
		Repair			4.0			1,2	
		Replace			3.0			1	
0107	METER AND CONTROL PANEL ASSEMBLY	Inspect			0.2				E
		Test			0.4			2,4,5 6,7	
		Align			0.2			1 thru 7	
		Repair			3.0			1	
		Replace			3.0			1	

Section II. MAINTENANCE ALLOCATION CHART FOR POWER SUPPLIES PP-7694/U THROUGH PP-7701/U

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINT FUNCTION	(4) MAINT CATEGORY					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
0108	FILTER PANEL ASSEMBLY	Inspect			0.1				
		Test			0.5			2	
		Repair			2.0			1,2	
		Replace			1.0			1	
0109	TERMINATION PANEL ASSEMBLY	Inspect			0.1				F
		Test			0.5			2	
		Repair			4.0			1,2	
		Replace			3.0			1	
0110	TERMINATION PANEL ASSEMBLY 4341-013A	Inspect			0.1				G
		Test			0.5			2	
		Repair			4.0			1,2	
		Replace			3.0			1	
0111	PANEL DISCONNECT	Inspect			0.1				G
		Test			0.5			2	
		Repair			4.0			1,2	
		Replace			3.0			1	
0112	FUSE PANEL ASSEMBLY MOD	Inspect			0.1				G
		Test			0.1			2	
		Repair	0.1					1	C
		Repair			2.0			1,2	
		Replace			1.0			1	
0113	RECTIFIER ASSEMBLY	Inspect	0.1						H
		Test			0.1			2	
		Service		0.1					A
		Adjust			0.5			1,2	
		Repair			2.0			1 thru 7	B

Section III. TOOL AND TEST EQUIPMENT RFQUIREMENTS FOR POWER SUPPLIES PP-7694/U THROUGH PP-7701/U

TOOL OR TEST EQUIP REF CODE	MAINT CATEGORY	NOMENCLATURE	NAT/NATO STOCK NUMBER	TOOL NUMBER
1	C,O,F	TOOL KIT, ELECTRONIC EQUIPMENT, TK105/G	5180-00-610-8177	(80058)
2	O,F	DIGITAL MULTIMETER, 8600A	6625-01-010-0088	(89536)
3	F	TEST SET, SEMICONDUCTOR DEVICE, TS-1836/U	6625-00-893-2628	(80058)
4	F	OSCILLOSCOPE MAINFRAME, DUAL TRACE, R7603 OPTION 1	6625-00-516-8414	(80009)
5	F	PLUG IN UNIT, ELECTRICAL TEST EQUIPMENT, 7B53A	6625-00-261-5139	(80009)
6	F	PLUG IN UNIT, ELECTRONIC EQUIPMENT, AM6880/U	6625-00-185-7817	(80009)
7	F	PROBE, SWITCHABLE, 6062A	6625-00-631-5360	(80009)
8	F	SOCKET HEAD SCREW KEY, 3/8 INCH, GGG-K-275	5120-00-198-5406	(81348)

SECTION IV. REMARKS

Ref Code	Remarks
A	External inspection and cleaning only.
B	Repair consists of inspecting, troubleshooting, component replacement, adjustment, and testing.
C	Replacement of blown fuses only.
D	Power supplies PP-7700/U and PP-7701/U have two of this item.
E	Visual inspection only.
F	Not used on power supplies PP-7700/U and PP-7701/U.
G	USAF only, use IAW AFCC DWG LDBWS01251AD000 (located at site).
H	Each power supply contains two of this item.

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

E-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain a power supply. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to ypu by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

E-2. EXPLANATION OF COLUMNS.

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material. (e.g., "Use cleaning compound, item 5, App. D").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

O - Organizational Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parenthesis, followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	8020-00-245-4509	Brush, Paint, M-B-391 (81348)	EA
2	O	8305-00-267-3015	Cloth, Cheesecloth, Lint Free, CCCC400 (81348)	A/R
3	O	7930-00-357-7386	Detergent, Special Purpose, P-D-1747 (81348)	PT
4	O	8010-00-285-4868	Enamel MIL-E-15090B, Formula 111, Type I, Class 2 (81349)	A/R
5	O	3010-00-514-1861	Primer Coating MIL-P-8585, TTP00600 (81348)	PT
6	O	5350-00-264-3489	Abrasive Paper, Assorted, P-P-105, Class 2 (81348)	A/R
7	O	8010-00-290-4079	Thinner, Paint, Mineral, MIL TT-T-291 (81348)	QT

GLOSSARY

This glossary defines terms used in this manual which may not be familiar.

Counter-EMF	A voltage dropping diode network.
Thyristor	A silicon controlled rectifier.
Triac	A dual direction silicon controlled rectifier.
Contactor Relay	An Electromagnetic relay.

INDEX

Page

A

Abbreviations, list of 1-3
AC input wires 5-14
Additional Authorization list C-1
Adjustments:
  Battery float voltage 5-21
  Current limit 5-16
  Equalize voltage 5-22
  High voltage alarm 5-19
  High voltage alarm relay 5-27
  High voltage control relay 5-25
  Load sharing 5-23
  Low voltage alarm 5-19
  Low voltage alarm relay 5-27
  Low voltage control relay 5-25
  Operating range 5-17
  Overvoltage shutdown 5-20
Administrative storage 5-65
Alarm wires, power board 5-11
Alarm wires, rectifier 5-11

B

Basic issue items B-1
Battery float voltage adjustment 5-21
Battery wires 5-13

C

Charge fuse replacement 4-14
Cleaning:
  Direct support 5-62
  Operator 3-6
  Organizational 4-12
Components of end item B-1
Controls and indicators, description and use 2-1
Cross reference list 1-3
Current limit adjustment 5-16

D

DC output wires 5-12
Description, equipment 1-4
Destruction of Army material to prevent enemy use 1-2
Difference between models 1-5
Diode replacement 4-57
Discharge fuse replacement 4-14
DS maintenance instructions 5-56
DS troubleshooting 5-33

E

Equalize voltage adjustment 5-22
Equipment data 1-7
Equipment improvement recommendations 1-2
Expendable supplies and materials list E-1

F

Filter capacitor replacement 5-60
Fuse replacement 3-4
Fuses 2-6

G

General information 1-1
Ground wires 5-13

H

High voltage alarm adjustment 5-19
High voltage alarm relay adjustment 5-27
High voltage control relay adjustment 5-25

I

Initial checks 2-10
Inspection:
  Direct support 5-56
  Organizational 4-13
Introduction 1-1

Page

L

Load sharing adjustment 5-23
Load wires 5-11
Low voltage alarm adjustment 5-19
Low voltage alarm relay adjustment 5-27
Low voltage control relay adjustment 5-25

M

Maintenance allocation chart D-1
Maintenance forms 1-2
Maintenance instructions:
  Direct support 5-56
  Operator 3-4
  Organizational 4-12

O

Operating instructions 2-1
Operating range adjustment 5-17
Operation:
  Under unusual conditions 2-15
  Under usual conditions 2-10
Operator:
  Cleaning 3-6
  Maintenance procedures 3-4
  PMCS 2-7
  Repair 3-6
  Troubleshooting 3-1
Organizational maintenance:
  Cleaning 4-12
  Maintenance procedures 4-12
  PMCS 4-2
  Troubleshooting 4-6
Overvoltage shutdown adjustment 5-20

P

Painting 4-15
PMCS:
  Operator 2-7
  Organizational 4-2
Preparation for storage or shipment 5-64

Page

Principles of operation:
  General 1-22
  Technical 5-30
Purpose of equipment 1-1

R

Records and reports 1-2
Rectifier checks and adjustment 5-3
References A-1
Remote voltage sensing 5-8
Repair parts 5-1
Replacement of:
  Charge fuse 4-14
  Diode 5-58
  Discharge fuse 4-14
  Filter capacitor 5-60
  Fuses 3-4
  SCR 5-58
  Triac 5-58

S

Safety care and handling 1-21
Scope of manual 1-1
SCR replacement 5-58
Service upon receipt 5-2
Shipping 5-64
Startup checkout 5-15
Storage 5-65

T

Technical data 1-7
Technical principles of operation 5-30
Testing a repaired power supply 5-64
Triac replacement 5-58
Troubleshooting:
  Direct support 5-33
  Operator 3-1
  Organizational 4-6

	Page
W	
Warranty	1-3
Wiring	5-8

By Order of the Secretaries of the Army and the Air Force:

JOHN A WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

DONALD J. DELANDRO
Brigadier General, United States Army
The Adjutant General

Official:

EARL T. O'LOUGHLIN
General, USAF, Commander, Air Force
Logistics Command

CHARLES A. GABRIEL
General, USAF
Chief of Staff

Distribution:

To be distributed in accordance with special list.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1985—605-042/20173

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN. . JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Commander
Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703-5007

DATE SENT: 10 July 1975

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

BE EXACT. . . PIN-POINT WHERE IT IS				
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER: SSG I. M. DeSpiritof 999-1776

SIGN HERE: SSG I. M. DeSpiritof

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

TEAR ALONG PERFORATED LINE

DEPARTMENT OF THE ARMY

____

____

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314

U.S. MAIL

SAMPLE

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: AMSEL-ME-MP
Fort Monmouth, NJ 07703-5007

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS

DATE SENT

PUBLICATION NUMBER TM 11-6130-428-14/ TO 35C1-2-844-1

PUBLICATION DATE 5 Sept 1985

PUBLICATION TITLE Oper, Org, DS & GS Maint Manual for Power Supplies PP-7694/U thru PP-7701/U

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPE OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2028-2

TEAR ALONG PERFORATED LINE

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

____

____

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314

U.S. MAIL

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: AMSEL-ME-MP
Fort Monmouth, NJ 07703-5007

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS

DATE SENT

PUBLICATION NUMBER TM 11-6130-428-14/ TO 35C1-2-844-1	PUBLICATION DATE 5 Sept 1985	PUBLICATION TITLE Oper, Org, DS & GS Maint Manual for Power Supplies PP-7694/U thru PP-7701/U

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPE OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2

TEAR ALONG PERFORATED LINE

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

____

____

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314

U.S. MAIL

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: AMSEL-ME-MP
Fort Monmouth, NJ 07703-5007

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS

DATE SENT

PUBLICATION NUMBER TM 11-6130-428-14/ TO 35C1-2-844-1

PUBLICATION DATE 5 Sept 1985

PUBLICATION TITLE Oper, Org, DS & GS Maint Manual for Power Supplies PP-7694/U thru PP-7701/U

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPE OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314

U.S.MAIL

TEAR ALONG PERFORATED LINE

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: AMSEL-ME-MP
Fort Monmouth, NJ 07703-5007

INFORMATION NOTES

1. DISTRIBUTION FUSES SHOWN ARE TYPICAL.
2. RECTIFIER CONNECTIONS SHOWN ARE TYPICAL AND ARE NOT NECESSARILY PROVIDED ON ALL MODELS.
3. TRANSISTOR VOLTAGE RELAY LIMITS FURNISHED ARE BASED ON A FLOAT VOLTAGE OF 2.20 AND EQUALIZE VOLTAGES UP TO 2.35 VOLTS PER CELL UNLESS OTHERWISE SPECIFIED.
4. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.
5. ALL RELAYS ARE SHOWN RELEASED.
6. FIGURES AND SYMBOLS ARE DRAWN IN DETACHED FORM WHERE AN OPEN CONTACT IS REPRESENTED BY A (X) THRU THE LINE AND A CLOSED CONTACT BY A (—). APP & ASSOCIATED CONTACTS HAVE THE SAME DESIGNATION.
7. TWO NUMBERS LISTED FOR A RELAY CONTACT DENOTES TWO SETS OF CONTACTS CONNECTED IN PARALLEL.
8. LEAD AND AND EQUIPMENT DESIGNATIONS FOLLOWED BY A DASH (—) INDICATE CKT AND EQUIMENT NUMBERING: 1 FOR 1ST FIGURE, CKT OR EQUIPMENT, 2 FOR 2ND ETC.
9. LEADS SHOWN TERMINATED IN COMPONENTS WITHOUT TERMINALS ARE FURNISHED WITH COMPONENTS.
10. -AMP DENOTES APPARATUS WITH VARIABLE AMPERE RATING.
11. TERM ON CARD RECEPTICLE SHOWN SOLID DENOTES LOCATION OF POLARIZING KEY.
12. WHEN REQUIRED, TBA TERMINALS 13 THRU 18 CAN BE STRAPPED TO TERM 11 FOR GROUND TO ALMS OR TERM I 10 FOR RESISTANCE BAT TO ALMS.
13. CHARGE GND TERM PNL IS NOT PROVIDED ON PP-7700/U OR PP-7701/U.

EL8VS001

FIGURE FO-1. POWER BOARD CHARGE AND DISCHARGE CIRCUIT. (SHEET 1 OF 3)

TABLE A

ALARM CONNECTIONS

ALARM TERMINATIONS WILL ACCOMMODATE UP TO 3 ALM BAT OR GND CKTS OR 2 CLOSED LOOP CKTS FOR EACH ALM FUNCTION. PROVIDE ALM CONNECTIONS IN ACCORDANCE WITH ALM CKT REQUIREMENTS

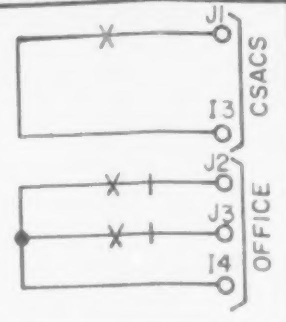
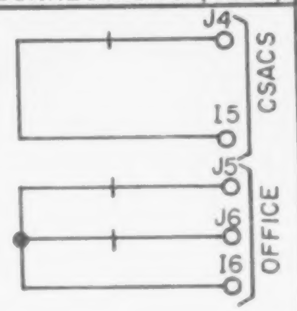
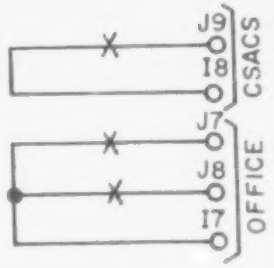
ALM FUNCTION	TERMINAL CONNECTIONS (T.B.A.)	ALM FUNCTION	TERMINAL CONNECTIONS (T.B.A.)	ALM FUNCTION	TERMINAL CONNECTIONS (T.B.A.)
RECTIFIER FAIL ALARM		HIGH-LOW VOLTAGE ALARM		FUSE ALARM	

TABLE B

BATTERY LEADS

CHARGE OR DISCHARGE CAPACITY OF PLANT, AMPERES	* LEAD SIZE Ⓑ, Ⓓ	MAX LOOP LENGTH BAT TO PWR BD		
		Ⓑ	Ⓓ	
50				
	4		38'	
	2		60'	
	0		95'	
100				
	2	60'		
	0	95'	48'	
	00		60'	
	000		75'	
	0000		95'	
200				
	000	76'		
	0000	95'		
	350 MCM		79'	
	500 MCM		112'	
400				
	(2) 000	76'		
	(2) 0000	95'		
	(2) 250 MCM	112'	56'	
	(2) 300 MCM		67'	
	(2) 350 MCM		79'	
	(2) 400 MCM		90'	
	(2) 500 MCM		112'	

TABLE C

CALCULATION OF VARIABLE LEAD SIZES

LEAD	LOOP DROP (VOLTS)	CALCULATE FOR
Ⓑ	1.0	ULTIMATE CHARGE CAPACITY OF PLANT
Ⓒ	1.0	RATED CHARGE CAPACITY OF RECTIFIER
Ⓓ	0.5	MAX DISCHARGE CAPACITY OF PLANT

TABLE D

DISCHARGE CAPACITY OF PLANT, AMPERES	LEAD SIZE Ⓐ
50	6
100	2
200	3/0
400	4/0

* LEAD SIZES SHOWN IN TABLE B ARE BASED ON 1978 NATIONAL ELECTRIC CODE TABLE, 310-16, FOR RH, THW AND EQUIV TYPE CONDUCTORS AT 30°C (86°F) AMBIENT.

FIG 1

RECTIFIER

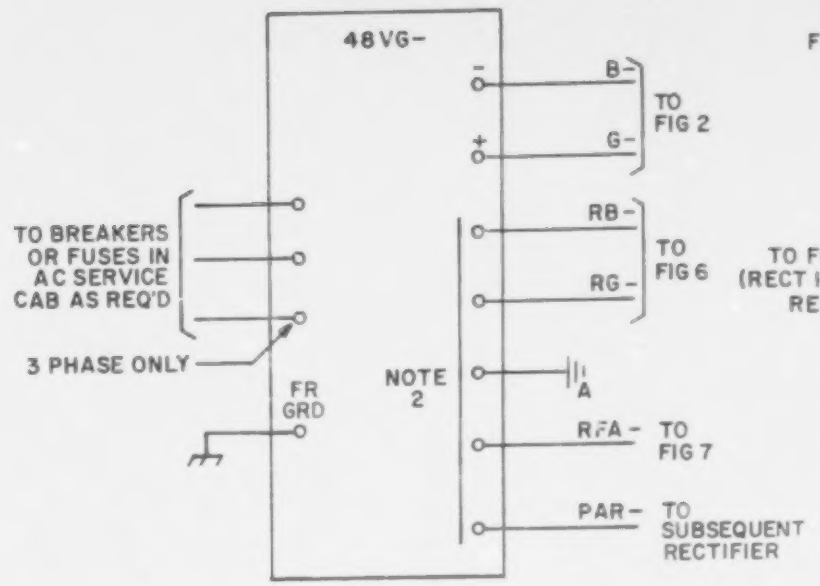

48VG-
-
+
B-
G-
TO FIG 2
RB-
RG-
TO FIG 6
TO BREAKERS OR FUSES IN AC SERVICE CAB AS REQ'D
3 PHASE ONLY
FR GRD
NOTE 2
A
RFA- TO FIG 7
PAR- TO SUBSEQUENT RECTIFIER

FIG 2

RECT CHARGE FUSES

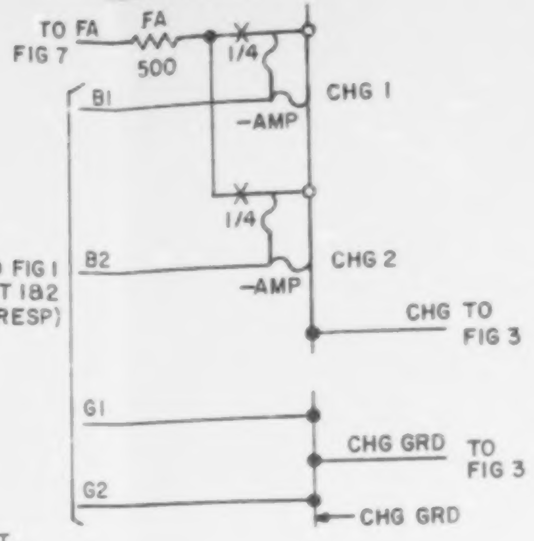

TO FIG 7
FA
FA
500
1/4
CHG 1
B1
-AMP
1/4
TO FIG 1 (RECT 1&2 RESP)
B2
-AMP
CHG 2
CHG TO FIG 3
G1
CHG GRD TO FIG 3
G2
CHG GRD

FIG 3

48V BATTERY

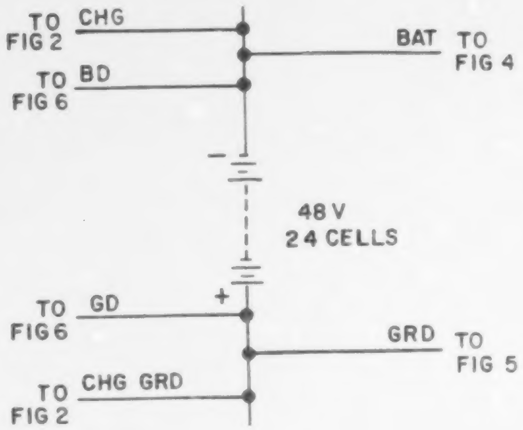
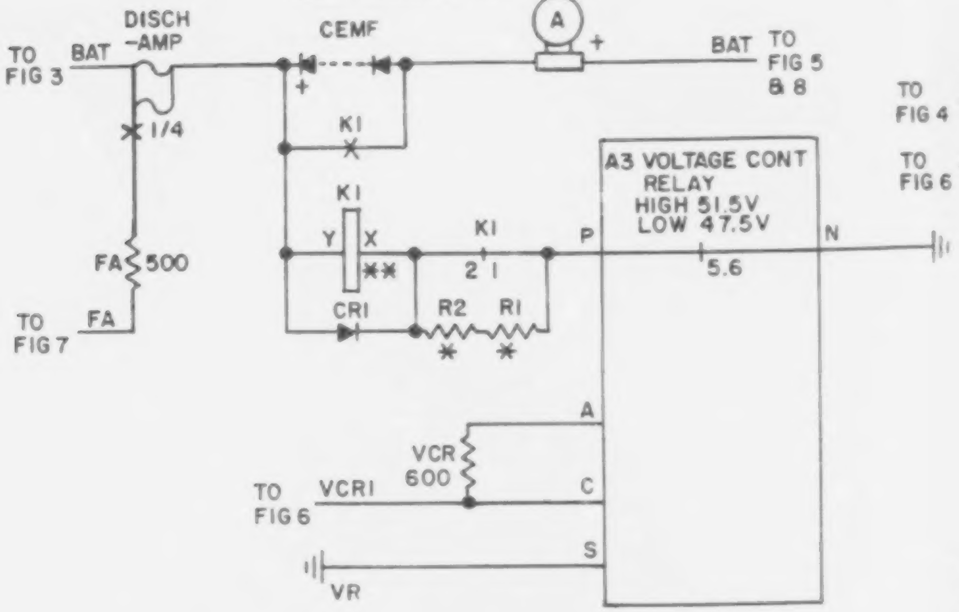

TO FIG 2 CHG
TO FIG 6 BD
BAT TO FIG 4
-
48V
24 CELLS
+
TO FIG 6 GD
GRD TO FIG 5
TO FIG 2 CHG GRD

FIG 4

CEMF CONTROL CKT


LOAD
A
+
TO FIG 3
BAT
DISCH -AMP
CEMF
+
BAT TO FIG 5 & 8
1/4
K1
K1
Y
X
**
K1
2 1
P
N
A3 VOLTAGE CONT RELAY HIGH 51.5V LOW 47.5V
5.6
FA 500
CR1
R2
R1
*
*
TO FIG 7 FA
A
VCR 600
C
TO FIG 6 VCR1
S
VR

(SEE NOTE 6)

—✱— = OPEN

—+— = CLOSED

PLANT CAPACITY	✱ R1,R2	✱✱ K1,K2
50-200A	39Ω	25.4Ω
400A	20Ω	25.1Ω

FIG 5

DISTRIBUTION FUSES

(NOTE 1)

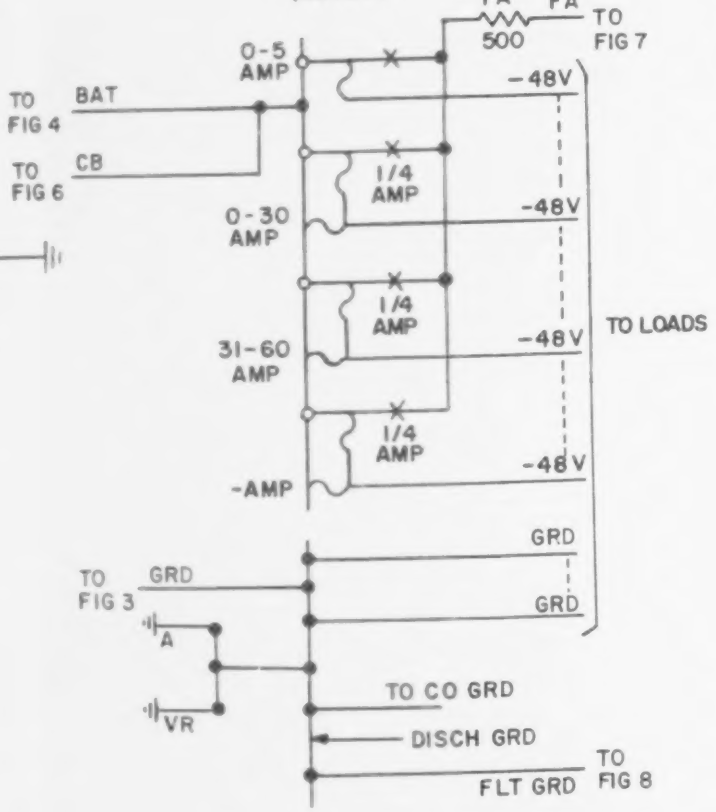
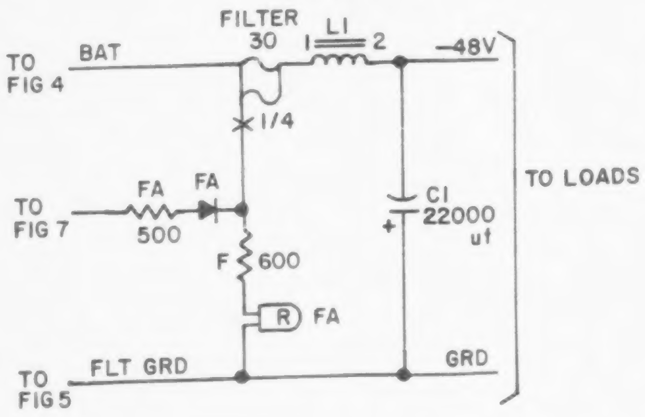

FA
500
FA
TO FIG 7
0-5 AMP
-48V
TO FIG 4 BAT
TO FIG 6 CB
1/4 AMP
0-30 AMP
-48V
1/4 AMP
31-60 AMP
-48V
TO LOADS
1/4 AMP
-AMP
-48V
GRD
TO FIG 3 GRD
GRD
A
VR
TO CO GRD
DISCH GRD
FLT GRD TO FIG 8

FIG 8

FILTER CKT


TO FIG 4
BAT
FILTER 30
1
L1
2
-48V
1/4
TO FIG 7
FA
500
FA
F
600
C1 22000 uf
+
TO LOADS
R
FA
TO FIG 5
FLT GRD
GRD

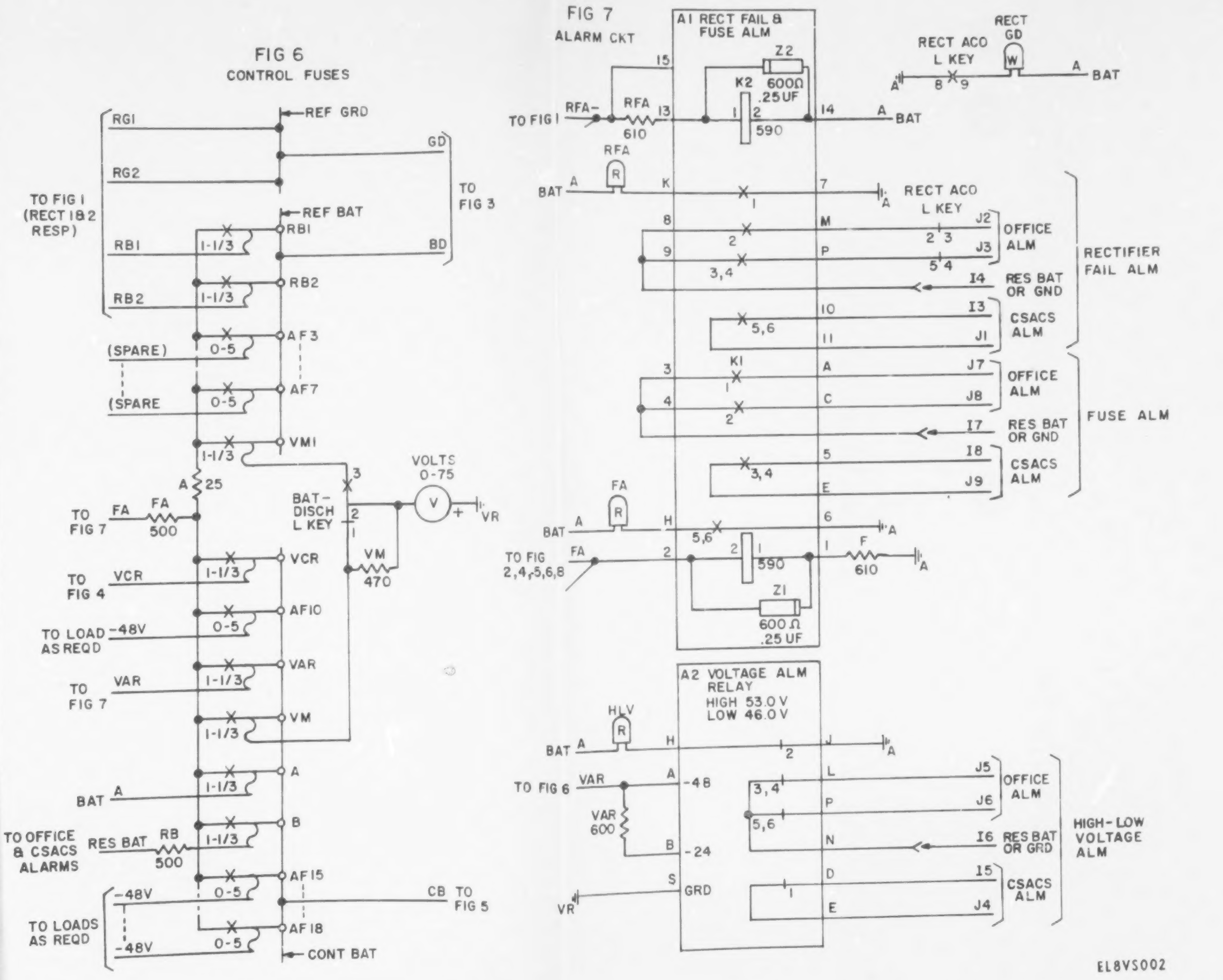


FIG 6
CONTROL FUSES
RG1
RG2
REF GRD
GD
TO FIG 3
BD
TO FIG 1 (RECT 1&2 RESP)
REF BAT
RB1
RB2
1-1/3
AF3
AF7
(SPARE)
0-5
VM1
A
25
TO FIG 7
FA
500
BAT-DISCH L KEY
VOLTS 0-75
V
VR
VM
470
VCR
TO FIG 4
AF10
TO LOAD AS REQD
-48V
VAR
TO FIG 7
BAT
B
TO OFFICE & CSACS ALARMS
RES BAT
RB
AF15
CB TO FIG 5
TO LOADS AS REQD
AF18
CONT BAT
FIG 7
ALARM CKT
A1 RECT FAIL & FUSE ALM
Z2
600Ω .25UF
K2
590
RFA
610
TO FIG 1
RFA-
RECT ACO L KEY
RECT GD
W
RECT ACO L KEY
OFFICE ALM
RES BAT OR GND
CSACS ALM
RECTIFIER FAIL ALM
K1
FUSE ALM
TO FIG 2,4,5,6,8
F
Z1
A2 VOLTAGE ALM RELAY
HIGH 53.0 V
LOW 46.0 V
HLV
TO FIG 6
VAR 600
-48
-24
GRD
HIGH-LOW VOLTAGE ALM
EL8VS002

FIGURE FO-1. POWER BOARD CHARGE AND DISCHARGE CIRCUIT. (ARMY ONLY) (SHEET 2 OF 3)

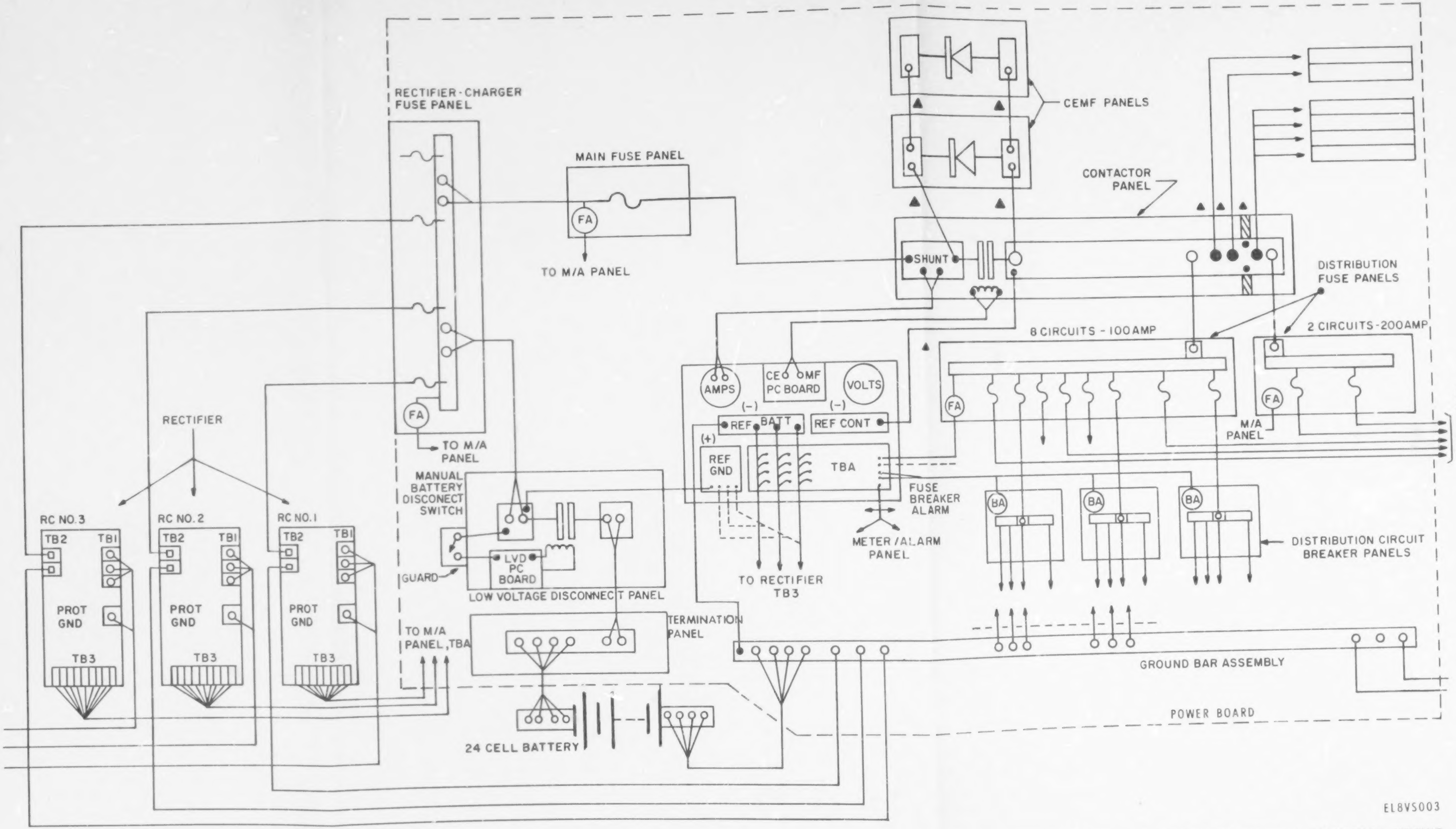
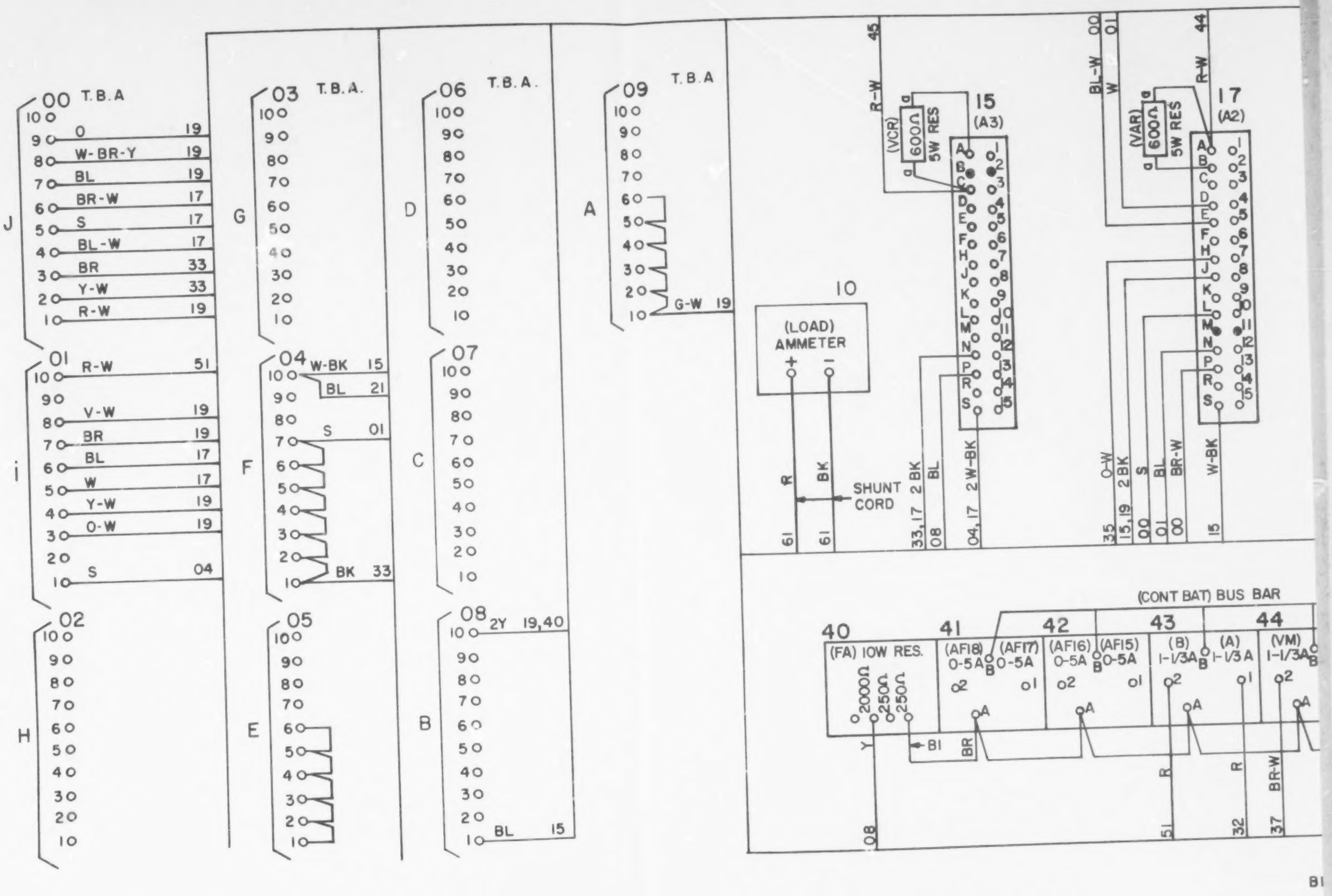
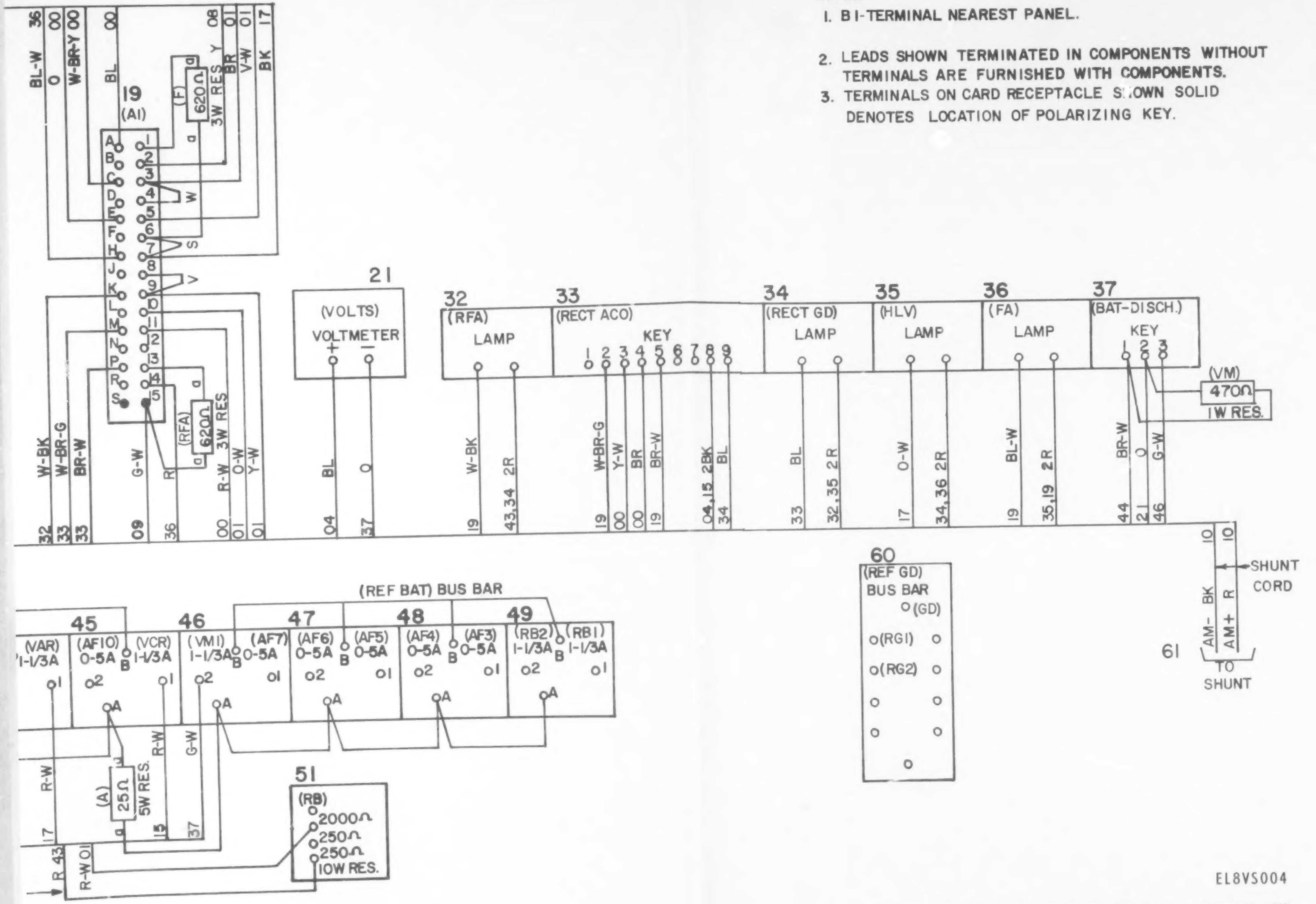

RECTIFIER-CHARGER FUSE PANEL
MAIN FUSE PANEL
FA
TO M/A PANEL
CEMF PANELS
CONTACTOR PANEL
SHUNT
DISTRIBUTION FUSE PANELS
8 CIRCUITS - 100 AMP
2 CIRCUITS - 200 AMP
AMPS
CE MF PC BOARD
VOLTS
(−)
REF BATT
(−)
REF CONT
(+)
REF GND
TBA
FA
TO M/A PANEL
M/A PANEL
DISTRIBUTION
FUSE BREAKER ALARM
METER/ALARM PANEL
TO RECTIFIER TB3
BA
BA
BA
DISTRIBUTION CIRCUIT BREAKER PANELS
RECTIFIER
RC NO. 3
RC NO. 2
RC NO. 1
TB2
TB1
PROT GND
TB3
MANUAL BATTERY DISCONECT SWITCH
GUARD
LVD PC BOARD
LOW VOLTAGE DISCONNECT PANEL
TERMINATION PANEL
TO M/A PANEL, TBA
24 CELL BATTERY
GROUND BAR ASSEMBLY
POWER BOARD
EL8VS003

FIGURE FO-1. POWER BOARD CHARGE AND DISCHARGE CIRCUIT. (AIR FORCE ONLY)(SHEET 3 OF 3)


00 T.B.A
J
01
i
02
H
03 T.B.A.
G
04
F
05
E
06 T.B.A.
D
07
C
08
B
09 T.B.A
A
10
(LOAD) AMMETER
SHUNT CORD
15 (A3)
(VCR) 600Ω 5W RES
17 (A2)
(VAR) 600Ω 5W RES
(CONT BAT) BUS BAR
40 (FA) 10W RES.
2000Ω
250Ω
250Ω
41 (AF18) 0-5A (AF17) 0-5A
42 (AF16) 0-5A (AF15) 0-5A
43 (B) 1-1/3A (A) 1-1/3A
44 (VM) 1-1/3A
W-BR-Y
BL
BR-W
S
BL-W
BR
Y-W
R-W
V-W
W
O-W
W-BK
BK
G-W
2Y
2 BK
2 W-BK
R
B1
B1

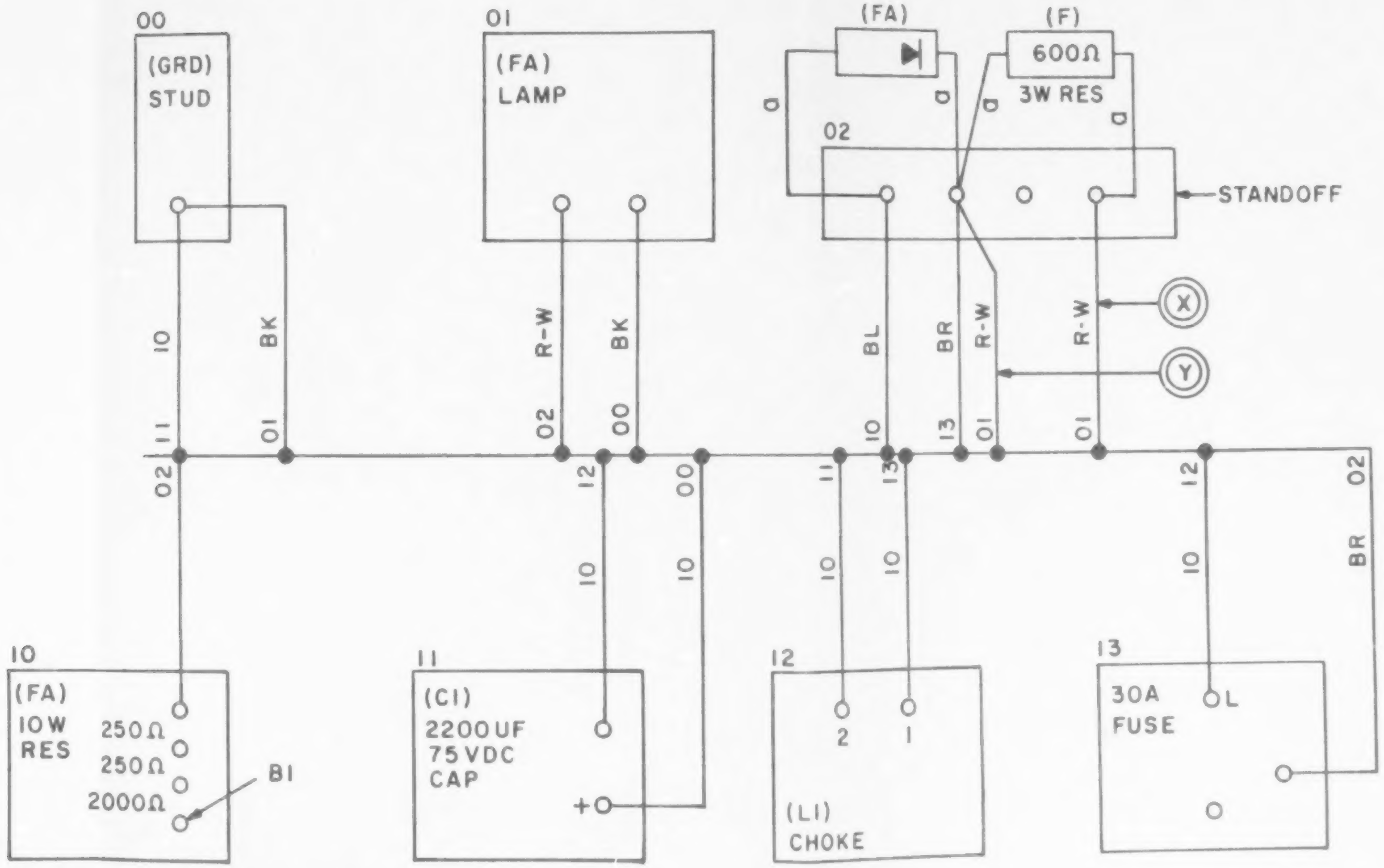
NOTES:

1. B1-TERMINAL NEAREST PANEL.
2. LEADS SHOWN TERMINATED IN COMPONENTS WITHOUT TERMINALS ARE FURNISHED WITH COMPONENTS.
3. TERMINALS ON CARD RECEPTACLE SHOWN SOLID DENOTES LOCATION OF POLARIZING KEY.


19
(A1)
(F)
620Ω
3W RES
(RFA)
620Ω
3W RES
BL-W
W-BR-Y
BL
BR
V-W
BK
W-BK
W-BR-G
BR-W
G-W
R-W
O-W
Y-W
21
(VOLTS)
VOLTMETER
32
(RFA)
LAMP
33
(RECT ACO)
KEY
34
(RECT GD)
LAMP
35
(HLV)
LAMP
36
(FA)
LAMP
37
(BAT-DISCH.)
KEY
(VM)
470Ω
1W RES.
2R
2BK
SHUNT CORD
AM-
AM+
61
TO SHUNT
60
(REF GD)
BUS BAR
(GD)
(RG1)
(RG2)
(REF BAT) BUS BAR
45
46
47
48
49
(VAR)
1-1/3A
(AF10)
0-5A
(VCR)
1-1/3A
(VM1)
1-1/3A
(AF7)
0-5A
(AF6)
0-5A
(AF5)
0-5A
(AF4)
0-5A
(AF3)
0-5A
(RB2)
1-1/3A
(RB1)
1-1/3A
(A)
25Ω
5W RES.
51
(RB)
2000Ω
250Ω
250Ω
10W RES.
R 43
R-W01

EL8VS004

FIGURE FO-2. POWER BOARD METER, CONTROL AND ALARM PANEL WIRING DIAGRAM.


00
(GRD)
STUD
01
(FA)
LAMP
(FA)
(F)
600Ω
3W RES
02
a
STANDOFF
X
Y
10
BK
R-W
BK
BL
BR
R-W
R-W
11
01
02
00
10
13
01
01
02
12
00
11
13
12
02
10
10
10
10
10
BR
10
(FA)
10W
RES
250Ω
250Ω
2000Ω
B1
11
(C1)
2200UF
75VDC
CAP
+
12
2
1
(L1)
CHOKE
13
30A
FUSE
L

NOTES:

1. B1 TERMINAL NEAREST PANEL.
2. POLARITY SHOWN IS FOR NEG PLANT (POS GRD) IF OPPOSITE POLARITY IS REQUIRED, REVERSE CAPACITOR AND DIODE CONNECTIONS ACCORDINGLY.
3. a - LEADS TO BE INSULATED WITH SLEEVING.

EL8VS005

FIGURE FO-3. POWER BOARD DECENTRALIZED POWER FILTER WIRING.

11-6130-428-14

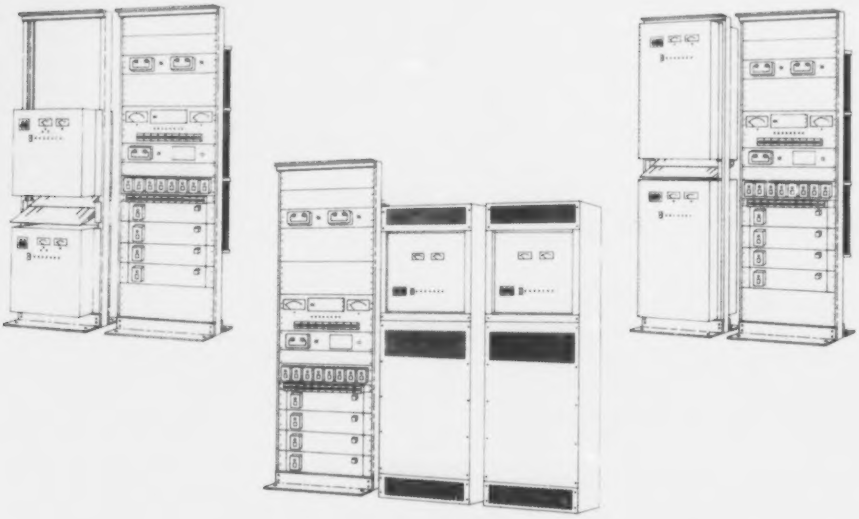
ARMY, TM 11-6130-428-14
AIR FORCE, TO 35C1-2-844-1

TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL FOR POWER SUPPLIES

NEWARK PUBLIC LIBRARY
JAN 15 1986
U. S. GOVT. PUBS.
DEPOSITORY 378

PP-7694/U, (NSN 6130-01-123-1881)
PP-7695/U, (NSN 6130-01-115-4653)
PP-7696/U, (NSN 6130-01-114-7825)
PP-7697/U, (NSN 6130-01-114-7826)
PP-7698/U, (NSN 6130-01-115-9130)
PP-7699/U, (NSN 6130-01-114-7827)
PP-7700/U, (NSN 6130-01-115-4651)
PP-7701/U, (NSN 6130-01-115-4652)



DEPARTMENTS OF THE ARMY AND THE AIR FORCE
5 SEPTEMBER 1985

EQUIPMENT DESCRIPTION Page 1-4
DIFFERENCE BETWEEN MODELS Page 1-5
PRINCIPLES OF OPERATION Page 1-22
OPERATOR'S PMCS Page 2-7
OPERATE UNDER USUAL CONDITIONS Page 2-10
OPERATOR'S TROUBLESHOOTING Page 3-1
OPERATOR'S MAINTENANCE Page 3-4
ORGANIZATIONAL PMCS Page 4-2
ORGANIZATIONAL TROUBLESHOOTING Page 4-6
ORGANIZATIONAL MAINTENANCE Page 4-12
SERVICE UPON RECEIPT OF EQUIP Page 5-2
TECHNICAL PRINCIPLES OF OPERATION Page 5-30
DIRECT SUPPORT TROUBLESHOOTING Page 5-33
DIRECT SUPPORT MAINTENANCE Page 5-56
PREPARATION FOR STORAGE OR SHIPMENT Page 5-64

D 101. 11:

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1 DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2 IF POSSIBLE , TURN OFF THE ELECTRICAL POWER

3 IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4 SEND FOR HELP AS SOON AS POSSIBLE

5 AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

READEX
FICHE

WARNING

HIGH VOLTAGE
is used in this equipment.
DEATH ON CONTACT
MAY RESULT IF SAFETY PRECAUTIONS
ARE NOT OBSERVED.

Maintenance adjustments of this equipment are made with power applied, be careful when working on or near AC input distribution wiring.

Never work on the power supply unless there is another person nearby who is familiar with the operation and hazards of this equipment. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, power to this equipment should be shut off before beginning work. After shuting off power, ground every capacitor likely to hold a dangerous potential. When working inside equipment that has been shut off, always ground every part before touching it.

Be careful not to bridge the gap between rectifier heat sink and rectifier case while power system is in operaion. An electrical shock will result.

Be careful not to contact high voltage input connections (120-415 V DC) when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Do not be misled by the term "low voltage". Potentials as low as 50 volts may cause death under adverse conditions. For artificial respiration refer to FM 21-11.

WARNING

Do not spray any cleaning agent inside or on the outside of power supply. When cleaning power supply, clean only the outside. Use only lint free cheesecloth and cleaning agent as authorized in appendix E.

WARNING

Trichlorotrifluorethene shall not be used as a cleaning agent for the power supply.

WARNING

Compressed air shall not be used for cleaning purposes in the power supply.

WARNING

A periodic review of safety precautions in TB 385-4, Safety Precautions for Maintenance of Electrical/Electronic Equipment, is recommended. DO NOT TOUCH exposed connections or components in power supply. MAKE CERTAIN not to contact ground when making connections or adjusting components inside the power supply.

WARNING

Don't take chances. Avoid personal injury. A power board or rectifier is heavy - it weighs 500-1000 pounds depending on model. Use a mechanical lift when moving a power supply component.

Technical Manual
No. 11-6130-428-14
Technical Order
No. 35C1-2-844-1

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
Washington, DC
5 September 1985

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

POWER SUPPLY PP-7694/U (NSN 6130-01-123-1881)
POWER SUPPLY PP-7695/U (NSN 6130-01-115-4653)
POWER SUPPLY PP-7696/U (NSN 6130-01-114-7825)
POWER SUPPLY PP-7697/U (NSN 6130-01-114-7826)
POWER SUPPLY PP-7698/U (NSN 6130-01-115-9130)
POWER SUPPLY PP-7699/U (NSN 6130-01-114-7827)
POWER SUPPLY PP-7700/U (NSN 6130-01-115-4651)
POWER SUPPLY PP-7701/U (NSN 6130-01-115-4652)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual, direct to: Commander, US Army Communications-Electronics Command, and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey, 07703-5007.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward direct to prime ALC/MST.

In either case, a reply will be sent directly to you.

Page

HOW TO USE THIS MANUAL. v

CHAPTER 1. INTRODUCTION. 1-1
Section I. General Information 1-1
II. Equipment Description 1-4
III. Principles of Operation 1-22

CHAPTER 2. OPERATING INSTRUCTIONS. 2-1
Section I. Description and use of Operator's Controls and Indicators. 2-1
II. Operator Preventive Maintenance Checks and Services (PMCS) 2-7
III. Operation Under Usual Conditions. 2-10
IV. Operation Under Unusual Conditions. 2-15

CHAPTER 3. OPERATOR MAINTENANCE INSTRUCTIONS 3-1
Section I. Lubrication Instructions. 3-1
II. Troubleshooting 3-1
III. Maintenance Instructions. 3-4

CHAPTER 4. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS . . . 4-1
Section I. Repair Parts, Special Tools, TMDE, and Support Equipment 4-1
II. Service Upon Receipt. 4-1
III. Organizational Preventive Maintenance Checks and Services (PMCS). 4-2
IV. Troubleshooting 4-6
V. Organizational Maintenance Procedures 4-12
VI. Preparation for Storage or Shipment 4-15

CHAPTER 5. DIRECT SUPPORT MAINTENANCE INSTRUCTIONS . . . 5-1
Section I. Repair Parts, Special Tools, TMDE, and Support Equipment 5-1
II. Service Upon Receipt. 5-2
III. Technical Principles of Operation 5-30
IV. Troubleshooting 5-33
V. Direct Support Maintenance Procedures 5-56
VI. Preparation for Storage or Shipment 5-64

CHAPTER 6. GENERAL SUPPORT MAINTENANCE INSTRUCTIONS. . . 6-1

APPENDIX A. REFERENCES. A-1
B. COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS B-1
C. ADDITIONAL AUTHORIZATION LIST C-1
D. MAINTENANCE ALLOCATION CHART. D-1
E. EXPENDABLE/DURABLE SUPPLIES AND MATERIAL LIST. E-1

GLOSSARY Glossary-1

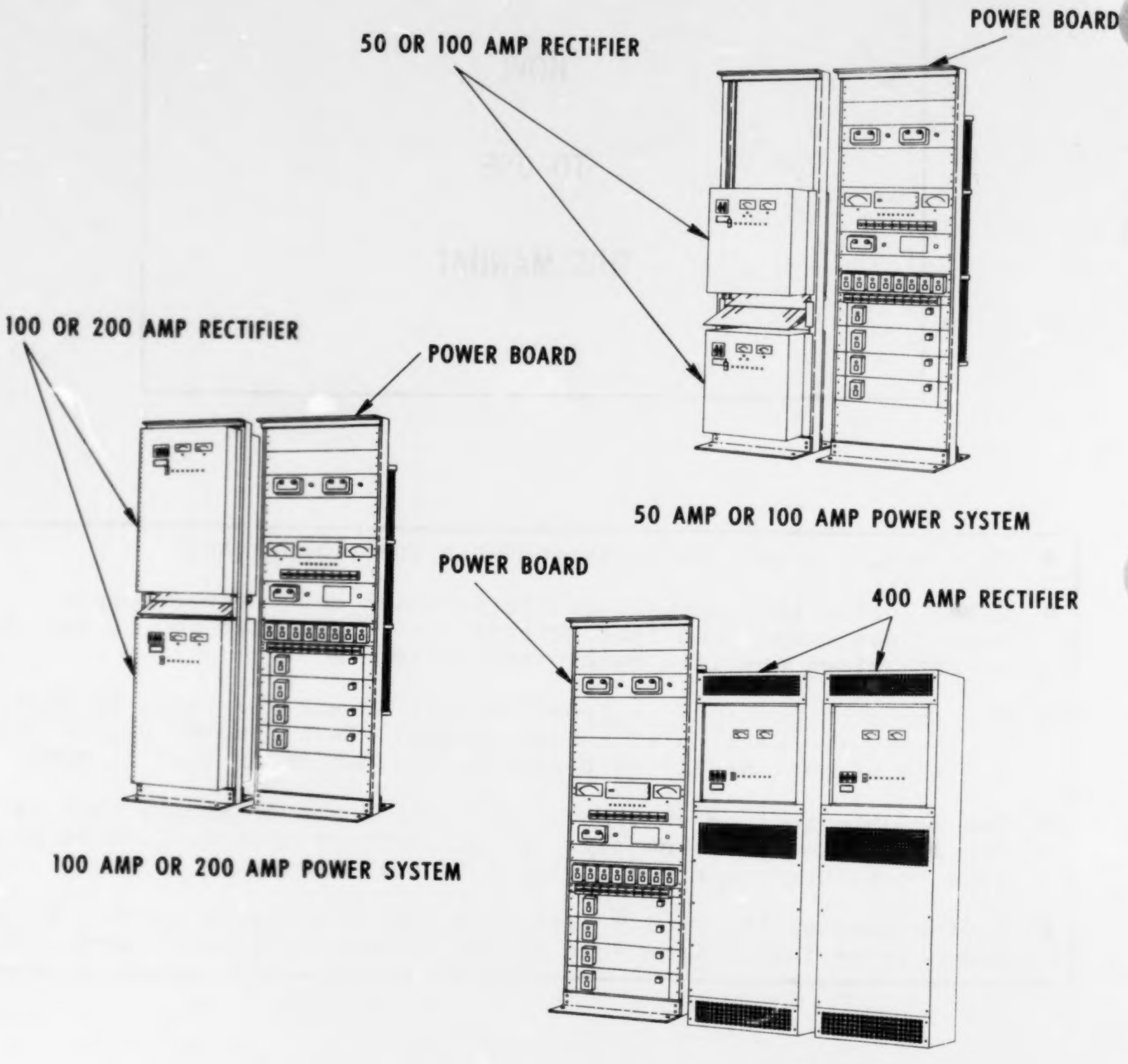
INDEX. Index-1

LIST OF ILLUSTRATIONS

FIGURE		PAGE
1-0	Power Supplies PP-7694/U thru PP-7701/U	1-0
FO-1	Power Board Charge and Discharge Circuit (sheet 1 of 3)	
FO-1	Power Board Charge and Discharge Circuit, Army Only (sheet 2 of 3)	
FO-1	Power Board Charge and Discharge Circuit, Air Force Only (sheet 3 of 3).	
FO-2	Power Board Meter, Control, and Alarm Panel Wiring Diagram.	
FO-3	Power Board Decentralized Power Filter Wiring. . . .	
FO-4	Power Board Voltage Control Relay Schematic.	
FO-5	Power Board Voltage Alarm Relay Schematic.	
FO-6	Power Board Distribution Circuit	
FO-7	PP-7694/U Rectifier Schematic.	
FO-8	PP-7695/U Rectifier Schematic.	
FO-9	PP-7696/U Rectifier Schematic.	
FO-10	PP-7697/U Rectifier Schematic.	
FO-11	PP-7698/U Rectifier Schematic.	
FO-12	PP-7699/U Rectifier Schematic.	
FO-13	PP-7700/U Rectifier Schematic.	
FO-14	PP-7701/U Rectifier Schematic.	
FO-15	Rectifier Power Supply Schematic for PP-7694/U and PP-7697/U.	
FO-16	Rectifier Power Supply Schematic for PP-7695/U, PP-7696/U, PP-7698/U, PP-9699/U, PP-7700/U, and PP-7701/U.	
FO-17	Rectifier Regulator and Alarm Circuit (sheet 1 of 2)	
FO-17	Rectifier Regulator and Alarm Circuit (sheet 2 of 2)	
FO-18	Rectifier Trigger Board Schematic.	

HOW
TO USE
THIS MANUAL

- This manual covers non-interruptable power supplies.
- Before using this manual, determine which model power supply is used. Use only those instructions that cover that model, and at an authorized specific maintenance level.
- Use table of contents in front of this manual, or index at rear to locate the section of manual needed. Each chapter starts with a table of contents to help locate information in that chapter.
- Use troubleshooting section in the chapter to determine what is wrong with the power supply. Do not attempt to troubleshoot beyond an authorized specific level of maintenance.
- Having located the faulty part, use the maintenance section in the chapter for instructions on how to replace damaged parts.


50 OR 100 AMP RECTIFIER
POWER BOARD
100 OR 200 AMP RECTIFIER
POWER BOARD
POWER BOARD
400 AMP RECTIFIER

50 AMP OR 100 AMP POWER SYSTEM

100 AMP OR 200 AMP POWER SYSTEM

400 AMP POWER SYSTEM

EL8VS000

FIGURE 1-0. POWER SUPPLIES PP-7694/U THROUGH PP-7701/U

CHAPTER 1

INTRODUCTION

	Paragraph
Administrative Storage	1-6
Capabilities and Features	1-11
Characteristics	1-10
Consolidated Index of Army Publications and Blank Forms	1-2
Cross Reference List	1-8
Destruction of Army Electronic Material	1-5
Difference Between Models	1-12
List of Abbreviations	1-7
Maintenance Forms, Records, and Reports	1-3
Power Board Data	1-13
Principles of Operation:	
Power Board	1-25
Rectifier	1-24
Rectifier Data:	
Common	1-14
PP-7694/U	1-15
PP-7695/U	1-16
PP-7696/U	1-17
PP-7697/U	1-18
PP-7698/U	1-19
PP-7699/U	1-20
PP-7700/U	1-21
PP-7701/U	1-22
Reporting Equipment Improvement Recommendations (EIR)	1-4
Safety, Care, and Handling	1-23
Scope	1-1
Warranty	1-9

Section I. GENERAL INFORMATION

1-1. SCOPE.

a. Type of Manual. This manual covers Operator's, Organizational, Direct Support, and General Support Maintenance Procedures.

b. Model Number and Equipment Name.

PP-7694/U 48 Volt Power Supply
PP-7695/U 48 Volt Power Supply
PP-7696/U 48 Volt Power Supply
PP-7697/U 48 Volt Power Supply
PP-7698/U 48 Volt Power Supply
PP-7699/U 48 Volt Power Supply
PP-7700/U 48 Volt Power Supply
PP-7701/U 48 Volt Power Supply

c. Purpose of Equipment. These power supplies are used as part of an uninteruptable power source at a Defense Communication System site.

1-2. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS.

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. MAINTENANCE FORMS, RECORDS, AND REPORTS.

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in Maintenance Management Update. Air Force personnel will use AFR 66-1 for maintenance reporting, and TO-00-35D54 for unsatisfactory equipment reporting.

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

c. Discrepancy in Shipment Report (DISREP)(SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

a. Army. If power supplies PP-7694/U through PP-7701/U need improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-PA-MA-D, Fort Monmouth, NJ 07703-5023. Well send you a reply.

b. Air Force. Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4.

1-5. DESTRUCTION OF ARMY ELECTRONICS MATERIAL.

Destruction of Army electronics material to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. ADMINISTRATIVE STORAGE.

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with PMCS charts before storing. When removing the equipment from administrative storage, the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in paragraphs 5-24 thru 5-26.

1-7. LIST OF ABBREVIATIONS.

A	amps
AC	alternating current
AFR	Air Force Regulation
AH	ampere hours
AR	Army Regulation
BTU/HR	british thermal units per hour
C	celsius
DA	Department of the Army
dB	decibels
DC	direct current
DD	Department of Defense
DS	Direct Support
EIR	Equipment Improvement Recommendation
EMF	electromotive force
F	fahrenheit
FA	fuse alarm
FM	Field Manual
HLV	high/low voltage
Hz	hertz
KHz	kilohertz
lbs	pounds
MAC	Maintenance Allocation Chart
MHz	megaherts
ms	milliseconds
MWO	Modification Work Order
NEMA	National Electrical Manufacturers Assn.
NSN	National Stock Number
PMCS	Preventive Maintenance Checks and Services
RF	radio frequency
RFA	rectifier failure alarm
RPSTL	Repair Parts and Special Tools List
SCR	silicon controlled rectifier
SF	Standard Form
TMDE	Test Measurement and Diagnostic Equipment
TM	Technical Manual
TO	Technical Order
V	volts
VAC	volts alternating current
VDC	volts direct current

1-8. CROSS REFERENCE LIST.

Common Name	Official Name	Part Number
A1 board	Power Board Alarm Assembly	4338-340
A2 board	Hi/Low Voltage Alarm Power Assembly	4863-027
A3 board	Sensing Relay Power Assembly	4863-024
Contactor relay	Relay, Electromagnetic	6041H217
Control board	Regulator and Alarm Power Assembly	4865-087
Trigger board	Circuit Card	4334-016

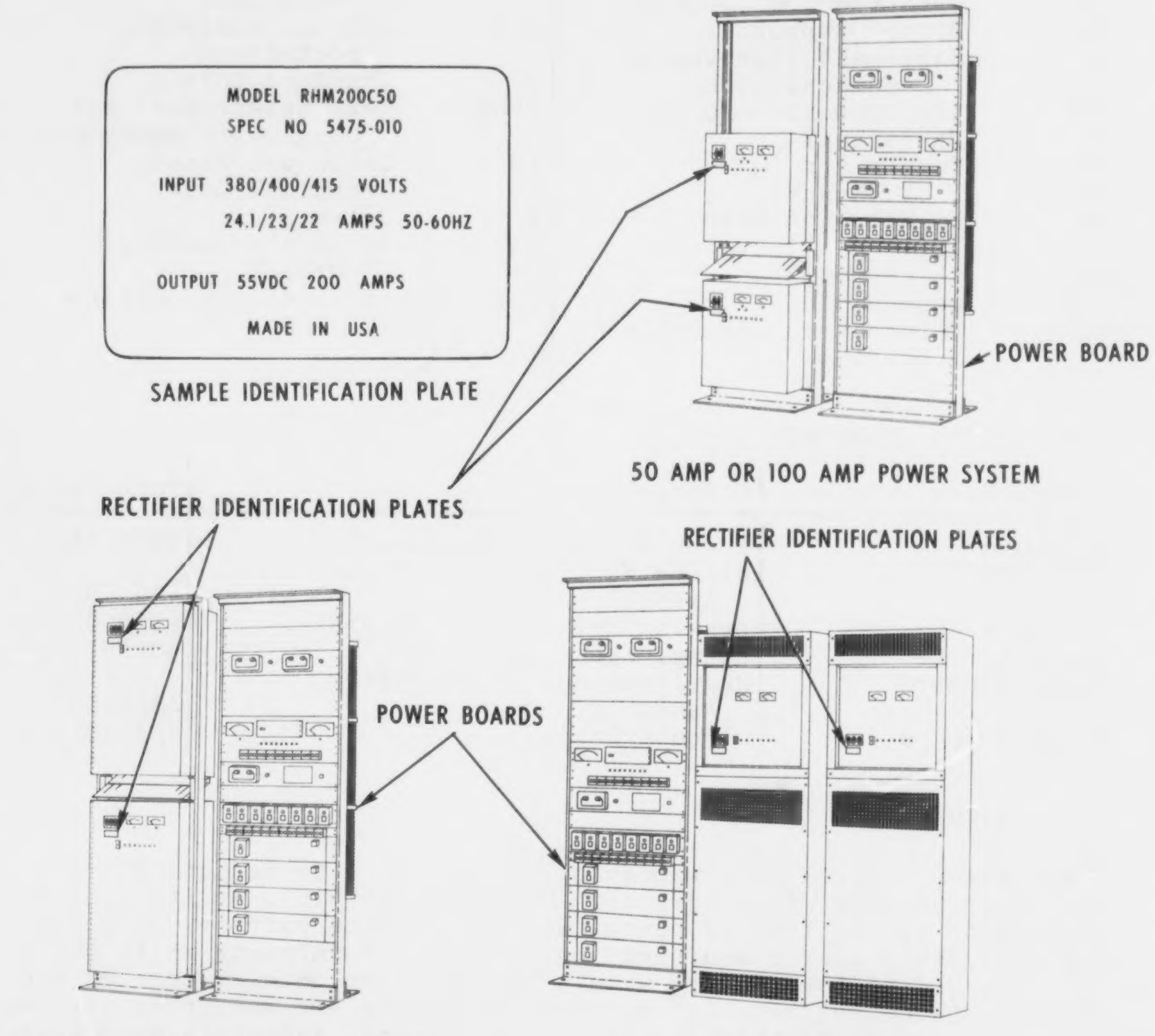
1-9. WARRANTY.

These power supplies are warranted to be free from defects for a period of 90 days after turn on. Manufacturer will, at its option, replace or repair free of charge and pay surface carrier charges on any adequately packed equipment covered by its warranty which shall be returned to the factory within 90 days from date of turn on and found to be defective. All circuit components are warranted for two years from original shipping date from factory, and which upon examination prove to be defective in material or workmanship.

Section II. EQUIPMENT DESCRIPTION

1-10. CHARACTERISTICS.

Power Supplies PP-7694/U through PP-7701/U consist of a power board and two or more rectifiers. The power supplies provide 48 volt DC power to a load, and maintain a charge on a 48 volt back-up battery. This battery will provide power to the load if AC power fails. The battery is a separate component and is not a part of a power supply.



MODEL RHM200C50
SPEC NO 5475-010
INPUT 380/400/415 VOLTS
24.1/23/22 AMPS 50-60HZ
OUTPUT 55VDC 200 AMPS
MADE IN USA

SAMPLE IDENTIFICATION PLATE

POWER BOARD
RECTIFIER IDENTIFICATION PLATES
RECTIFIER IDENTIFICATION PLATES
POWER BOARDS

50 AMP OR 100 AMP POWER SYSTEM

100 AMP OR 200 AMP POWER SYSTEM

400 AMP POWER SYSTEM

1-11. CAPABILITIES AND FEATURES.

a. Capabilities

(1) Output, 50, 100, 200, or 400 amps, depending on model.
(2) Power supplies can be combined to meet additional 48 volt requirements.
(3) Adjustable DC output voltage.

b. Features

(1) Counter EMF cell used to prevent load voltage increase when charging battery.
(2) Triggers an external alarm if:

  (a) A power board fuse opens.
  (b) The load voltage varies outside of set limits.
  (c) A rectifier fails.

(3) Load current and voltage meters.
(4) Overvoltage shutdown protection.
(5) Rectifier output current and voltage meters.

1-12. DIFFERENCE BETWEEN MODELS.

a. The most important difference between the eight power supplies is:

(1) Output current.
(2) Input voltage.

b. Physical differences between models are minor, and will be covered as needed.

c. Air Force power supplies have been modified to include:

(1) Four rectifiers.
(2) Two additional power board charge fuses.
(3) A power board battery disconnect switch.

d. The power supply model number may be determined from the model identification plate on front of power board, or from the number on the front of a rectifier. Refer to the following table.

TABLE 1-1

DIFFERENCE BETWEEN MODELS

MODEL NUMBER	PP-7694/U	PP-7695/U	PP-7696/U	PP-7697/U	PP-7698/U	PP-7699/U	PP-7700/U	PP-7701/U
Rectifier ID Number	RL50F50	RHM100C50	RHM200C50	RL100F50	RHM100D50	RHM200D50	RHM400C50	RHM400D50
Input Voltage	120-240	380-415	380-415	120-240	208-240	208-240	380-415	208-240
Output Current	50 A	100 A	200 A	100 A	100 A	200 A	400 A	400 A
Output Voltage (Nominal)	48 V	48 V	48 V	48 V	48 V	48 V	48 V	48 V
Voltmeter Range	0-75 V	0-75 V	0-75 V	0-75 V	0-75 V	0-75 V	0-75 V	0-75 V
Ammeter Range	0-75 A	0-150 A	0-300 A	0-150 A	0-150 A	0-300 A	0-600 A	0-600 A
Two rectifiers in one frame	X	X	X	X	X	X		
Two Separate Rectifiers							X	X
Power Supply Number	1232F2L1	1232F2L2	1232F2L3	1232F2L4	1232F2L5	1232F2L6	1232F2L7	1232F2L8

1-13. POWER BOARD DATA.

All power supplies covered in this manual use the same basic power board. Each power supply uses a different rectifier.

Width	25 Inches
Depth	20 Inches
Height	7 Feet

Voltage Control Relay:

Release	49.0 volts
Operate	51.5 volts

Voltage Alarm Relay:

Low	45.5 volts
High	54.0 volts

Charge and Discharge Fuses:

PP-7694/U	80 amps
PP-7695/U	150 amps
PP-7696/U	300 amps
PP-7697/U	150 amps
PP-7698/U	150 amps
PP-7699/U	300 amps
PP-7700/U	600 amps
PP-7701/U	600 amps

1-14. RECTIFIER DATA, COMMON

Paragraphs 1-14 through 1-22 give equipment data for the rectifiers.

The data listed in paragraph 1-14 applies to all power supplies covered in this manual.

Additional data for each rectifier is listed under the power supply model number, and can be found in paragraphs 1-15 through 1-22.

Nominal Voltage	48 VDC
Number of Cells	23 or 24
Float Range	48.3-55.2 VDC
Equalize Range	Float to 58.8 VDC
Regulation:	
Static	Steady state output voltage remains within ±1/2% of any voltage within the range of 48.3 to 55 volts at any load current from no load to full load for the input voltage, frequency and operating ambient temperature ranges specified below.
Dynamic	For a step load change from 20% to 100% of full rated current, the maximum voltage transient does not exceed ±5% of the initial steady state voltage. Recovery to within steady state voltage regulation range does not exceed 200 milliseconds and all transient behavior disappears within 500 milliseconds.
Filtering:	
Voice Band Noise	Does not exceed 22 dB of reference noise.
Wide Band Noise	The noise does not exceed 200 millivolts peak to peak over the frequency range of 10 Hz to 14 Hz when measured on a battery in AH at four times the output current rating of the rectifier.
Output Protection, Current Limiting	Factory set at 100% of full load. Adjustable from 90% to 125% of full rated load. Continuous operation above factory setting is not recommended.
Remote Voltage Sensing	Point of regulation may be extended to battery or power board terminals.
LOW VOLTAGE ALARM Lamp	If voltage falls below a preset value, normally 47.15 V, this alarm lamp lights and two common alarm circuits close. Value is adjustable from 39.1 V to 52.8 V.
HIGH VOLTAGE ALARM Lamp	If voltage rises above a preset value, normally 57.6 V, this alarm lamp lights and two common alarm circuits close. Value is adjustable from 52.8 V to 60.0 V.

Load Sharing	A circuit is furnished to obtain a proportional division of the load with other negative buss load sharing equipped rectifiers.
Remote Equalize	Provision is made for remote control of float-equalize operation.
Audible Noise	The audible noise at any point five feet from any vertical surface of the rectifier does not exceed 55 dB.
Current Walk-in	Output current will be gradually increased to no greater than 50% of full load in 5 seconds, 75% of full load in 7.5 seconds, and 90% of full load in 9.0 seconds.
Emergency Restoration	A rectifier may be started when connected to a dead or nearly dead battery.
Meters	3-1/2 inch (88.9 mm) rectangular DC voltmeter and ammeter, ±2% accuracy at full scale.
Operating Temperature	0 to 50 degrees C (-32 to 122 degrees F).
Storage Temperature	-40 to 85 degrees C (-40 to 185 degrees F).
Operating Humidity	0 to 95%
Operating Altitude	Sea Level to 10,000 feet.

1-15. RECTIFIER DATA, PP-7694/U.

(Rectifier Identification Number RL50F50)

Output Current	50 amps
Input Voltage	Nominal 120/127/208/220/230/240 volts single phase, 47 to 53 or 57 to 63 Hz. Ranges of 108-132, 114-140, 187-229, 198-242, 207-253, and 216-264 volts respectivly.

Typical data with 52.08 volts at the battery. Data assumes one volt drop in battery leads at full load.

Voltage and Tap	Amount of Load	Amperes	Watts
120	No Load	3.70	130
	Half Load	12.50	1460
	Full Load	27.70	2950
127	No Load	4.20	120
	Half Load	11.70	1450
	Full Load	24.20	2920
208	No Load	1.90	120
	Half Load	7.25	1460
	Full Load	14.85	2950
220	No Load	2.20	130
	Half Load	6.75	1450
	Full Load	14.00	2940
230	No Load	1.75	110
	Half Load	6.50	1450
	Full Load	13.35	2940
240	No Load	3.65	130
	Half Load	6.35	1500
	Full Load	12.75	2930

	Maximum input current with 55 volts output at the rectifier.					
Nominal Input	120 V	127 V	208 V	220 V	230 V	240 V
Input Voltage	120 V	127 V	208 V	220 V	230 V	240 V
Max. Input Current	35.80 amps	34.00 amps	20.55 amps	19.25 amps	18.80 amps	17.80 amps

Power Circuit	Controlled Ferroresonant
Input Protection	A two pole circuit breaker opens one side of 120 and 127 volt services and both sides of 208/220/230/240 volt services. Rated at 25 amps.
Output Protection:	
Short Circuit	70 amp.

Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more than 2% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.
Alarm Relay	Contacts are rated at 28 V, 2 amps.
LOW CURRENT ALARM Lamp	If current falls below 1/2% of full load, or if the rectifier turns off, this alarm lamp lights and two common alarm circuits close.
Conducted Radio Frequency Interference	Interference voltages in the frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
Heat Dissipation	1010 BTU/HR

1-16. RECTIFIER DATA, PP-7695/U.

(Rectifier Identification Number RHM100C50)

Output Current	100 amps
Input Voltage	Nominal 380/400/415 volts, three phase, 47 to 63 Hz with taps provided for 380, 400, and 415 volts with a variation within ±10% of the voltage.

Typical data with 52.08 V at the rectifier.

Voltage and Tap	Amount of Load	Amperes	Watts
380	No Load	0.09	40
	Half Load	5.82	2870
	Full Load	11.88	6120
400	No Load	0.10	50
	Half Load	5.52	2850
	Full Load	11.24	6070

Voltage and Tap	Amount of Load	Amperes	Watts
415	No Load	0.12	50
	Half Load	5.28	2850
	Full Load	10.92	6150

	Maximum input current with 55 volts output at the rectifier with full load and low line.		
Tap	380 V	400 V	415 V
Input Voltage	342 V	360 V	373 V
Input Current	33.3 A	31.7 A	30.7 A

Power Circuit	Delta-double wye connected six phase star.
Input Protection	Not furnished.
Output Protection:	
Short Circuit	150 amp.
Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more than 2% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.
Alarm Relay	Contacts are rated at 26 V, 1 amp.
LOW CURRENT ALARM Lamp	If current falls below 1/2% of full load, or if the rectifier fails, this alarm lamp lights and two common alarm circuits close.
Conducted Radio Frequency Interference	Interference voltages in a frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
Heat Dissipation	3220 BTU/HR

1-17. RECTIFIER DATA, PP-7696/U.

(Rectifier Identification Number RHM200C50)

Output Current	200 amps
Input Voltage	Nominal 380/400/415 volts, three phase, 47 to 63 Hz with taps provided for 380, 400, and 415 volts with a variation within ±10% of the voltage.

Typical data with 52.08 V at the rectifier.

Voltage and Tap	Amount of Load	Amperes	Watts
380	No Load	1.17	150
	Half Load	12.18	5647
	Full Load	23.55	11384
400	No Load	1.04	155
	Half Load	11.45	5607
	Full Load	22.47	11335
415	No Load	1.00	160
	Half Load	11138	5647
	Full Load	21.49	11286

Maximum input current with 55 volts output at the rectifier with full load and low line.

Tap	380 V	400 V	415 V
Input Voltage	342 V	360 V	373 V
Input Current	33.3 A	31.7 A	30.7 A

Power Circuit	Delta-double wye connected six phase star.
Input Protection	Not furnished.
Output Protection:	
Short Circuit	250 amp.
Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more than 2% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.

Alarm Relay	Contacts are rated at 26 V, 1 amp.
LOW CURRENT ALARM Lamp	If current falls below 1/2% of full load, or if the rectifier fails, this alarm lamp lights and two common alarm circuits close.
Conducted Radio Frequency Interference	Interference voltages in a frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
Heat Dissipation	3305 BTU/HR

1-18. RECTIFIER DATA, PP-7697/U.

(Rectifier Identification Number RL100F50)

Output Current	100 amps
Input Voltage	Nominal 120/127/208/220/230/240 volts single phase, 47 to 53 or 57 to 63 Hz. Ranges of 108-132, 114-140, 187-229, 198-242, 207-253, and 216-264 volts respectively.

Typical data with 52.08 volts at the battery. Data assumes one volt drop in battery leads at full load.

Voltage and Tap	Amount of Load	Amperes	Watts
120	No Load	8.8	264
	Half Load	26.2	3016
	Full Load	51.0	5911
127	No Load	8.0	264
	Half Load	25.0	3016
	Full Load	46.0	5911
208	No Load	5.6	268
	Half Load	15.0	3037
	Full Load	30.5	5911
220	No Load	4.2	256
	Half Load	14.2	3058
	Full Load	28.9	5911

Voltage and Tap	Amount of Load	Amperes	Watts
230	No Load	4.3	260
	Half Load	13.2	3056
	Full Load	26.6	5870
240	No Load	4.6	264
	Half Load	13.0	3058
	Full Load	26.0	5911

	Maximum imput current with 55 volts output at the rectifier.					
Nominal Input	120 V	127 V	208 V	220 V	230 V	240 V
Input Voltage	108 V	114 V	187 V	198 V	207 V	216 V
Max. Input Current	71.0 A	66.0 A	40.0 A	35.5 A	33.8 A	32.8 A

Power Circuit	Controlled Ferroresonant
Input Protection	A two pole circuit breaker opens one side of 120 and 127 volt services and both sides of 208/220/230/240 volt services. Rated at 40 amps.
Output Protection:	
Short Circuit	125 amp.
Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more than 2% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.
Alarm Relay	Contacts are rated at 28 V, 2 amps.
LOW CURRENT ALARM Lamp	If current falls below 1/2% of full load, or if the rectifier turns off, this alarm lamp lights and two common alarm circuits close.
Conducted Radio Frequency Interference	Interference voltages in the frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
Heat Dissipation	2190 BTU/HR

1-19. RECTIFIER DATA, PP-7698/U.

(Rectifier Identification Number RHM100D50)

Output Current	100 amps
Input Voltage	Taps provided for nominal 208/240 volts, 3 phase 57 to 63 Hz, with ranges of 184 to 220 and 212 to 254 volts.

Typical data with 52.08 volts at the battery. Data assumes one volt drop in battery leads at full load.

Voltage and Tap	Amount of Load	Amperes	Watts
208	No Load	0.36	60
	Half Load	10.80	2800
	Full Load	22.00	6020
240	No Load	.34	62
	Half Load	9.30	2800
	Full Load	19.05	5178

Maximum input current with 55 volts output at the rectifier.

Input Voltage	208 V	240 V
Max. Input Current	28.5 A	24.8 A

Power Circuit	Delta-double wye connected six phase rectifier.
Input Protection	Not furnished.
Output Protection:	
Short Circuit	150 amp.
Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more than 3% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.
Alarm Relay	Contacts are rated at 26 V, 1 amp.
LOW CURRENT ALARM Lamp	If current falls below 2% of full load, or if the rectifier turns off, this alarm lamp lights and two common alarm circuits close.

Conducted Radio Frequency Interference	Interference voltages in the frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
End Cell Charging	The output voltage can be increased for any tap at its nominal voltage for charging three end cells by switching the DC output and leaving the reference connected across the main 23 cell string.
Heat Dissipation	3200 BTU/HR

1-20. RECTIFIER DATA, PP-7699/U.

(Rectifier Identification Number RHM200D50)

Output Current	200 amps
Input Voltage	Taps provided for nominal 208/240 volts, 3 phase, 57 to 63 Hz, with ranges of 184 to 220 and 212 to 254 volts.

Typical data with 52.08 volts at the battery. Data assumes one volt drop in battery leads at full load.

Voltage and Tap	Amount of Load	Amperes	Watts
208	No Load	2.45	171
	Half Load	23.13	5894
	Full Load	45.10	12410
240	No Load	2.08	174
	Half Load	19.69	5842
	Full Load	38.67	12230

Maximum input current with 55 volts output at the rectifier.

Input Voltage	208 V	240 V
Max. Input Current	57.25 A	49.13 A

Power Circuit	Delta-double wye connected six phase rectifier.
Input Protection	Not furnished.
Output Protection:	
Short Circuit	250 amp.
Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more than 3% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.
Alarm Relay	Contacts are rated at 26 V, 1 amp.
LOW CURRENT ALARM Lamp	If current falls below 2% of full load, or if the rectifier turns off, this alarm lamp lights and two common alarm circuits close.
Conducted Radio Frequency Interference	Interference voltages in the frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
End Cell Charging	The output voltage can be increased for any tap at its nominal voltage for charging three end cells by switching the DC output and leaving the reference connected across the main 23 cell string.
Heat Dissipation	6125 BTU/HR

1-21. RECTIFIER DATA, PP-7700/U.

(Rectifier Identification Number RHM400C50)

Output Current	400 amps
Input Voltage	Nominal 380/400/415 volts, three phase, 47 to 63 Hz with taps provided for 380, 400, and 415 volts with a variation within ±10% of the voltage.

Typical data with 52.08 V at the rectifier.

Voltage and Tap	Amount of Load	Amperes	Watts
380	No Load	0.59	140
	Half Load	22.90	11350
	Full Load	44.90	23400
400	No Load	0.56	200
	Half Load	21.67	11350
	Full Load	43.20	23200
415	No Load	0.54	200
	Half Load	21.00	11300
	Full Load	41.33	23000

Maximum input current with 55 volts output at the rectifier with full load and low line.

Tap	380 V	400 V	415 V
Input Voltage	342 V	360 V	373 V
Input Current	44.2 A	41.9 A	40.4 A

Power Circuit	Delta-double wye connected six phase star.
Input Protection	Not furnished.
Output Protection:	
Short Circuit	600 amp.
Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more then 2% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.
Alarm Relay	Contacts are rated at 26 V, 1 amp.
LOW CURRENT ALARM Lamp	If current falls below 1/2% of full load, or if the rectifier fails, this alarm lamp lights and two common alarm circuits close.
Conducted Radio Frequency Interference	Interference voltages in a frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
Heat Dissipation	8770 BTU/HR

1-22. RECTIFIER DATA, PP-7701/U.

(Rectifier Identification Number RHM400D50)

Output Current	400 amps
Input Voltage	Taps provided for nominal 208/240 volts, 3 phase, 57 to 63 Hz, with ranges of 184 to 220 and 212 to 254 volts.

Typical data with 52.08 volts at the battery. Data assumes one volt drop in battery leads at full load.

Voltage and Tap	Amount of Load	Amperes	Watts
208	No Load	3.36	312
	Half Load	44.20	11948
	Full Load	86.36	25422
240	No Load	2.91	315
	Half Load	37.64	11712
	Full Load	73.46	24898

Maximum input current with 55 volts output at the rectifier.

Input Voltage	208 V	240 V
Max. Input Current	107.5 A	93.75 A

Power Circuit	Delta-double wye connected six phase rectifier.
Input Protection	Not furnished.
Output Protection:	
Short Circuit	600 amp.
Overvoltage Shutdown	Rectifier will shutdown if its output voltage exceeds a preset value, and it is delivering more than 5% current. Factory set at 59.0 V. Adjustable from 52.8 V to 60.0 V.
Alarm Relay	Contacts are rated at 26 V, 1 amp.
LOW CURRENT ALARM Lamp	If current falls below 2% of full load, or if the rectifier turns off, this alarm lamp lights and two common alarm circuits close.

Conducted Radio Frequency Interference	Interference voltages in the frequency range of 150 KHz to 25 MHz on the AC input and DC output power line will not exceed the broad band conducted radiation on NEMA standards.
End Cell Charging	The output voltage can be increased for any tap at its nominal voltage for charging three end cells by switching the DC output and leaving the reference connected across the main 23 cell string.
Phase Shift	The main power transformer shifts the phase of current to lower line distortion when several units are operated in parallel.
Heat Dissipation	14300 BTU/HR

1-23. SAFETY, CARE, AND HANDLING.

A power supply carries very high current and can be extremely dangerous if not handled correctly. Never work on a power supply unless authorized to do so, and do not get careless. A mistake can kill. When working on a power supply, do not take short cuts. It isn't worth the risk. For additional information refer to the warning pages at the front of this manual.

BE SAFE, NOT SORRY

Section III. PRINCIPLES OF OPERATION

1-24. RECTIFIER.

NOTE

Refer to Ⓐ through Ⓙ on the following rectifier block diagram.

Ⓐ AC INPUT SWITCH RELAY TRIP. Shuts down rectifier if output voltage exceeds allowable limits.

Ⓑ POWER TRANSFORMER. Reduces AC input power to a nominal 48 VAC.

Ⓒ THYRISTOR AND DIODE ASSEMBLIES. Rectifies AC power to DC. Phase controlled by the regulator circuit to maintain correct output voltage.

Ⓓ OUTPUT FILTER. Removes ripple from rectified current.

Ⓔ OUTPUT FUSE. Protects rectifier from an overload.

Ⓕ OUTPUT DISCONNECT SWITCH. Disconnects rectifier from the power board.

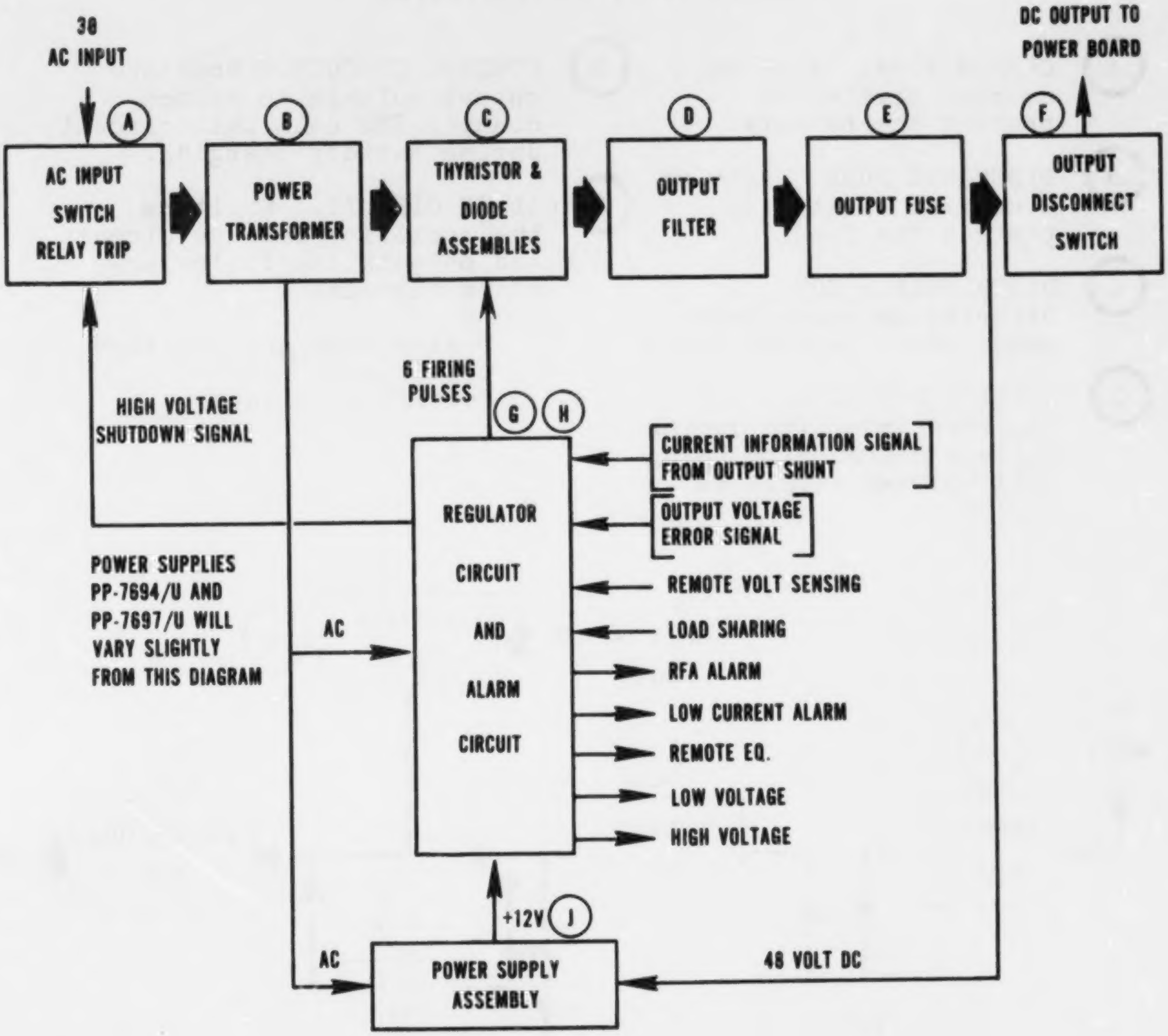
Ⓖ REGULATOR CIRCUIT. Monitors the following four circuits to control firing of the thyristors:

Current information signal.
Output voltage.
Remote voltage sensing.
Load sharing.

Ⓗ ALARM CIRCUIT. Outputs the following alarm signals:

Rectifier failure.
Low current.
High voltage.
Low voltage.

Ⓙ POWER SUPPLY ASSEMBLY. Supplies DC voltage for use by the regulator and alarm circuit.


3θ
AC INPUT
A
AC INPUT SWITCH RELAY TRIP
B
POWER TRANSFORMER
C
THYRISTOR & DIODE ASSEMBLIES
D
OUTPUT FILTER
E
OUTPUT FUSE
F
OUTPUT DISCONNECT SWITCH
DC OUTPUT TO POWER BOARD
HIGH VOLTAGE SHUTDOWN SIGNAL
6 FIRING PULSES
G
H
REGULATOR CIRCUIT AND ALARM CIRCUIT
CURRENT INFORMATION SIGNAL FROM OUTPUT SHUNT
OUTPUT VOLTAGE ERROR SIGNAL
REMOTE VOLT SENSING
LOAD SHARING
RFA ALARM
LOW CURRENT ALARM
REMOTE EQ.
LOW VOLTAGE
HIGH VOLTAGE
AC
+12V
J
AC
POWER SUPPLY ASSEMBLY
48 VOLT DC

POWER SUPPLIES
PP-7694/U AND
PP-7697/U WILL
VARY SLIGHTLY
FROM THIS DIAGRAM

RECTIFIER BLOCK DIAGRAM

1-25. POWER BOARD.

NOTE

Refer to Ⓐ through Ⓕ on following block diagram.

Ⓐ CHARGE FUSE. Acts as a current limiter to protect the battery.

Ⓑ DISCHARGE FUSE. Acts as a current limiter to protect the load.

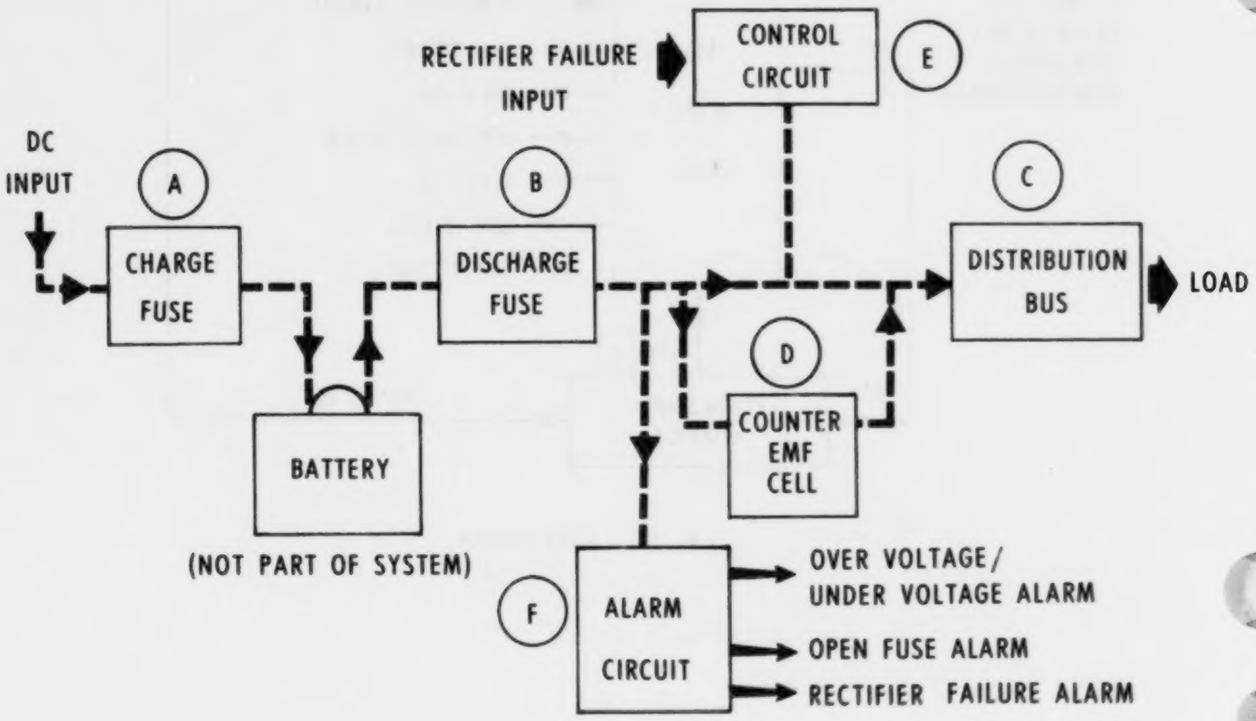
Ⓒ DISTRIBUTION BUS Distributes power from power board to site loads.

Ⓓ COUNTER EMF CELL. Inserted into line during battery charging to hold load voltage within set limits.

Ⓔ CONTROL CIRCUIT. Monitors output voltage to switch counter EMF cell into circuit during battery charging.

Ⓕ ALARM CIRCUIT. Monitors the rectifier failure circuit and outputs the following alarm signals:

Overvoltage/undervoltage.
Open fuse.
Rectifier failure


RECTIFIER FAILURE INPUT
CONTROL CIRCUIT
E
DC INPUT
A
CHARGE FUSE
B
DISCHARGE FUSE
C
DISTRIBUTION BUS
LOAD
D
COUNTER EMF CELL
BATTERY
(NOT PART OF SYSTEM)
F
ALARM CIRCUIT
OVER VOLTAGE/ UNDER VOLTAGE ALARM
OPEN FUSE ALARM
RECTIFIER FAILURE ALARM

CHAPTER 2

OPERATING INSTRUCTIONS

Paragraph

Alarm Circuits 2-12
Battery Equalize Charging. 2-11
General Information. . . . 2-1
Initial Checks 2-8
Operation Under Unusual Conditions; General. . . 2-14
Operation Under Usual Conditions; General. . . 2-7
Operator PMCS, General . . 2-5
Operator PMCS Table. . . . 2-6

Paragraph

Power Board Controls and Indicators. 2-3
Power Board Fuses and Battery Disconnect Switch 2-4
Preliminary Switch Positions. 2-9
Rectifier Controls and Indicators. 2-2
Stopping Procedures 2-13
Turning on Power. 2-10

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. GENERAL INFORMATION.

The operator of these power supplies should know the purpose of the controls and indicators on the rectifier and power board.

In this section, controls and indicators are discussed in a general way. Section II covers operator's preventive maintenance checks and services. Sections III and IV give specific instructions for operating the power supply.

2-2. RECTIFIER CONTROLS AND INDICATORS.

NOTE

The following drawing shows the typical control panel of a PP-7700/U rectifier. Other rectifier models may have a slightly different control panel.

① OUTPUT VOLTAGE meter - This meter shows the rectifier output voltage.

② OUTPUT CURRENT meter - This meter shows the rectifier output current.

③ This screw is used to zero adjust the meter pointer.

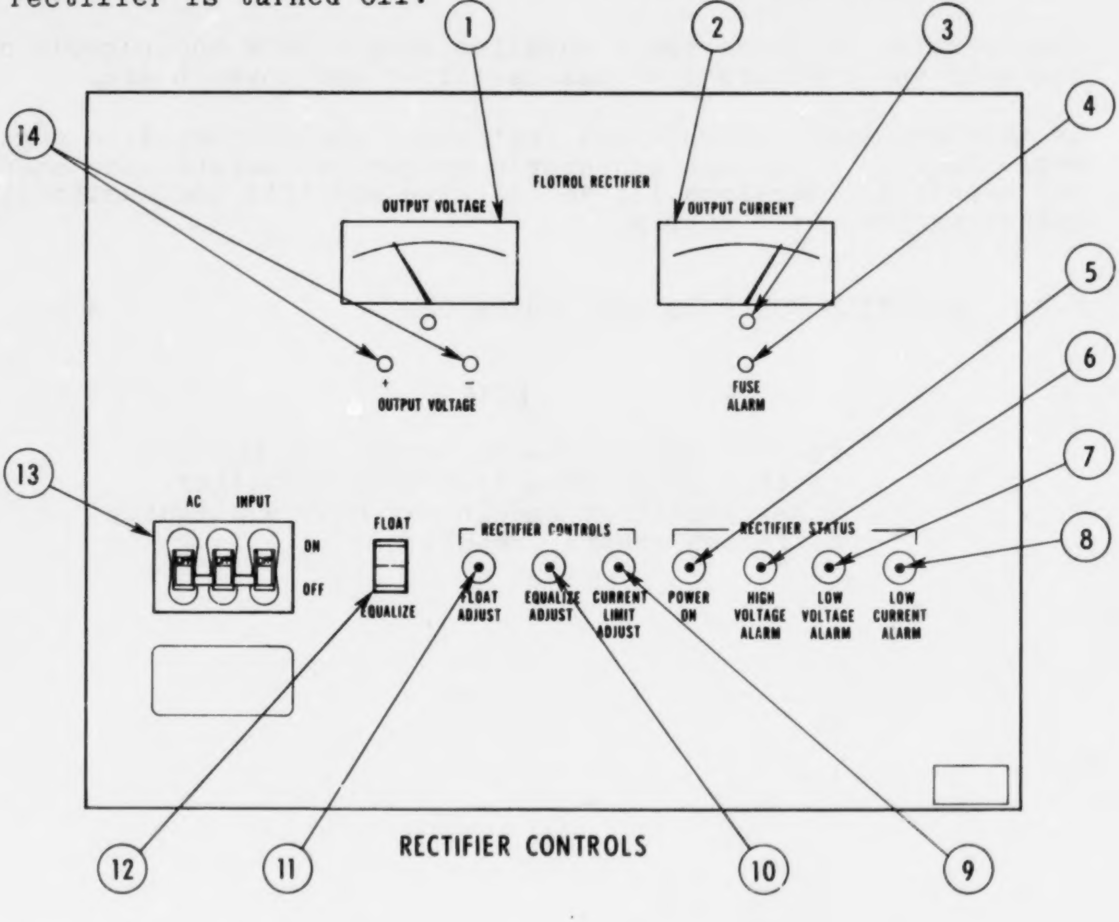
④ FUSE ALARM lamp (PP-7699/U and PP-7701/U only) - This lamp lights if a fuse blows inside the rectifier.

⑤ POWER ON lamp - When this lamp is lit, power is being applied to rectifier.

⑥ HIGH VOLTAGE ALARM lamp - This lamp lights if battery voltage increases above a preset value (normally 57.6 V).

⑦ LOW VOLTAGE ALARM lamp - This lamp lights if battery voltage falls below a preset value (normally 47.15 V).

⑧ LOW CURRENT ALARM lamp - This lamp lights if rectifier is supplying less than 0.5% of its rated output current, or if rectifier is turned off.


1
2
3
4
14
FLOTROL RECTIFIER
OUTPUT VOLTAGE
OUTPUT CURRENT
5
+
−
OUTPUT VOLTAGE
FUSE ALARM
6
7
13
AC INPUT
ON
OFF
FLOAT
EQUALIZE
RECTIFIER CONTROLS
FLOAT ADJUST
EQUALIZE ADJUST
CURRENT LIMIT ADJUST
RECTIFIER STATUS
POWER ON
HIGH VOLTAGE ALARM
LOW VOLTAGE ALARM
LOW CURRENT ALARM
8
12
11
10
9

RECTIFIER CONTROLS

NOTE

Items ⑤ ⑥ ⑦ and ⑧ may be connected to an external alarm system. Check to see if power supply is connected to an external alarm.

Power supplies PP-7700/U and PP-7701/U also have an external alarm circuit for high rectifier temperature. If temperature of a rectifier exceeds +85 degrees C (+185 degrees F), this alarm will activate, and rectifier output will be reduced by 33%. When rectifier temperature decreases, alarm will stop, and rectifier will return to full operation.

⑨ CURRENT LIMIT ADJUST - This is an access hole to a potentiometer that is used to set output current limit. Rectifier will not produce current above this value.

⑩ EQUALIZE ADJUST - This is an access hole to a potentiometer that is used to set equalize charge voltage. Rectifier will recharge battery at this level.

⑪ FLOAT ADJUST - This is an access hole to a potentiometer that is used to set float voltage. Rectifier will maintain battery and power board output at this level.

⑫ FLOAT/EQUALIZE Switch:

FLOAT - When top of switch is pushed in, rectifier supplies all load demand, and maintains site battery in a fully charged condition.

EQUALIZE - When bottom of switch is pushed in, rectifier supplies all load demand, and recharges site battery.

⑬ AC INPUT switch - This is a ganged three pole rectifier ON/OFF switch.

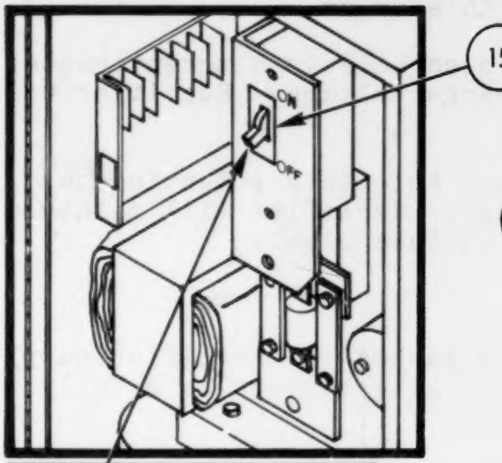
⑭ OUTPUT VOLTAGE (PP-7694/U, PP-7699/U, and PP-7701/U only) - These access holes can be used to check output voltage.

WARNING

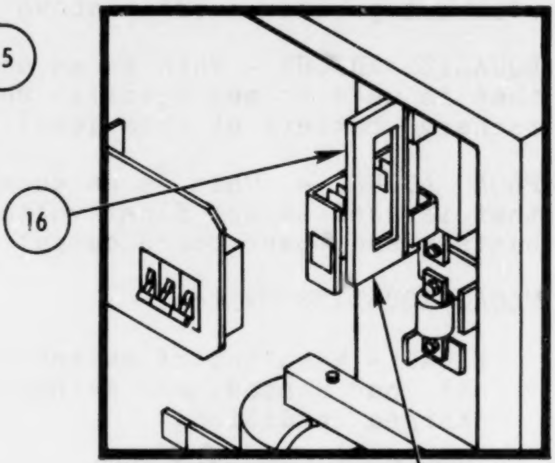
Items ⑮ and ⑯ are inside rectifier. Voltage of 120 VAC through 415 VAC is present inside rectifier when in operation. Do not open door if rectifier is operating. For additional safety information refer to warning pages in front of manual.

⑮ Battery Disconnect Switch (PP-7694/U through PP-7699/U) - This switch disconnects rectifier from site battery.

⑯ Battery Disconnect Link (PP-7700/U and PP-7701/U - This link, when removed, disconnects rectifier from site battery.



PP-7694/U THRU PP-7699/U
BATTERY DISCONNECT SWITCH



PP-7700/U AND PP-7701/U
BATTERY DISCONNECT LINK

2-3. POWER BOARD CONTROLS AND INDICATORS.

① VOLTS meter - This meter shows DC load voltage, or battery voltage, depending on setting of BAT/DISCH switch.

② BAT/DISCH switch:

DISCH - When arrow on switch is pointing to DISCH, the VOLTS meter shows DC load voltage.

BAT - When arrow on switch is pointing to BAT, the VOLTS meter shows battery voltage.

③ FA lamp - This lamp lights if a power board fuse blows.

④ HLV lamp - This lamp lights if power supply output voltage falls below 46 volts, or rises above 53 volts.

⑤ RECT GD lamp - This lamp lights if rectifier failure external alarm circuit has been turned off.

⑥ RECT/ACO (Rectifier Alarm Cutoff) switch - When arrow on this switch is pointing up, rectifier failure external alarm circuit is turned off. Normal switch position is horizontal.

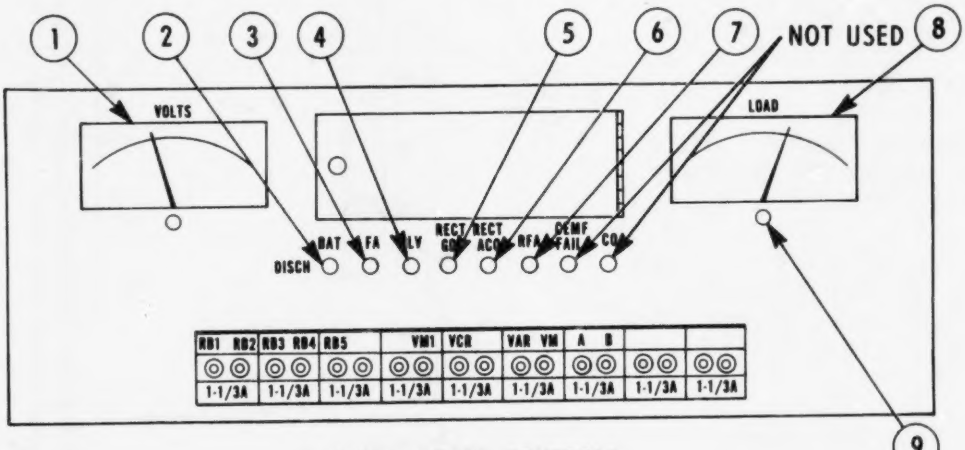
⑦ RFA lamp - This lamp lights if a rectifier fails.

NOTE

Items ③ ④ and ⑦ may be connected to an external alarm system. Check to see if power supply is connected to an external alarm.

⑧ LOAD meter - This meter shows DC load current.

⑨ This screw is used to zero adjust the meter pointer.


①
②
③
④
⑤
⑥
⑦
NOT USED
⑧
⑨
VOLTS
LOAD
DISCH
BAT
FA
HLV
RECT GD
RECT ACO
RFA
CEMF FAIL
CO
RB1 RB2
RB3 RB4
RB5
VM1
VCR
VAR VM
A B
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A

POWER BOARD CONTROLS

2-4. POWER BOARD FUSES AND BATTERY DISCONNECT SWITCH.

① Charge fuses - Each fuse connects one rectifier to the battery (Air Force power supplies have four charge fuses).

② Circuit protection fuse block - These 18 fuses are used to protect power board internal circuits, and low amp load circuits. Each fuse has an indicator which will pop out if fuse blows.

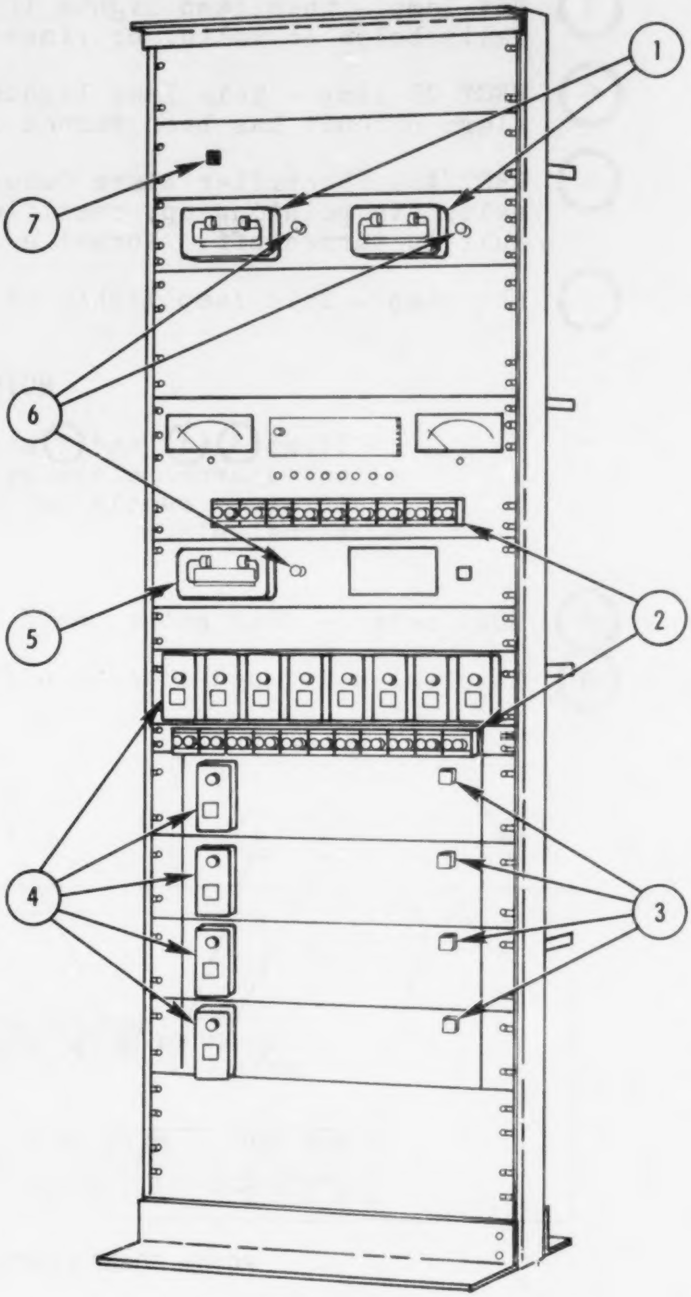
③ Open fuse lamps - This lamp will light if fuse beside it blows.

④ Load protection fuse blocks - These fuses are used to protect external load circuits from damage. Each fuse block also has an indicator fuse which will pop out if main fuse blows.

⑤ Discharge fuse - This fuse connects battery to distribution buss.

⑥ Indicator fuses - This fuse will blow and indicator will pop out if main fuse beside it blows.

⑦ Battery disconnect switch (Air Force only) - This switch disconnects the site battery from the power supply.



FRONT OF POWER BOARD

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-5. GENERAL.

To be sure that power supply continues to operate correctly, perform scheduled Preventive Maintenance Checks and Services (PMCS). When doing any PMCS or routine checks, keep in mind the WARNINGS and CAUTIONS about electrical shock and bodily harm. See the warning pages in front of this manual.

2-6. PMCS TABLE.

The PMCS table for the power supply is at the end of this section. The only interval listed for operator PMCS is D. A mark in this column indicates that this item should be checked.

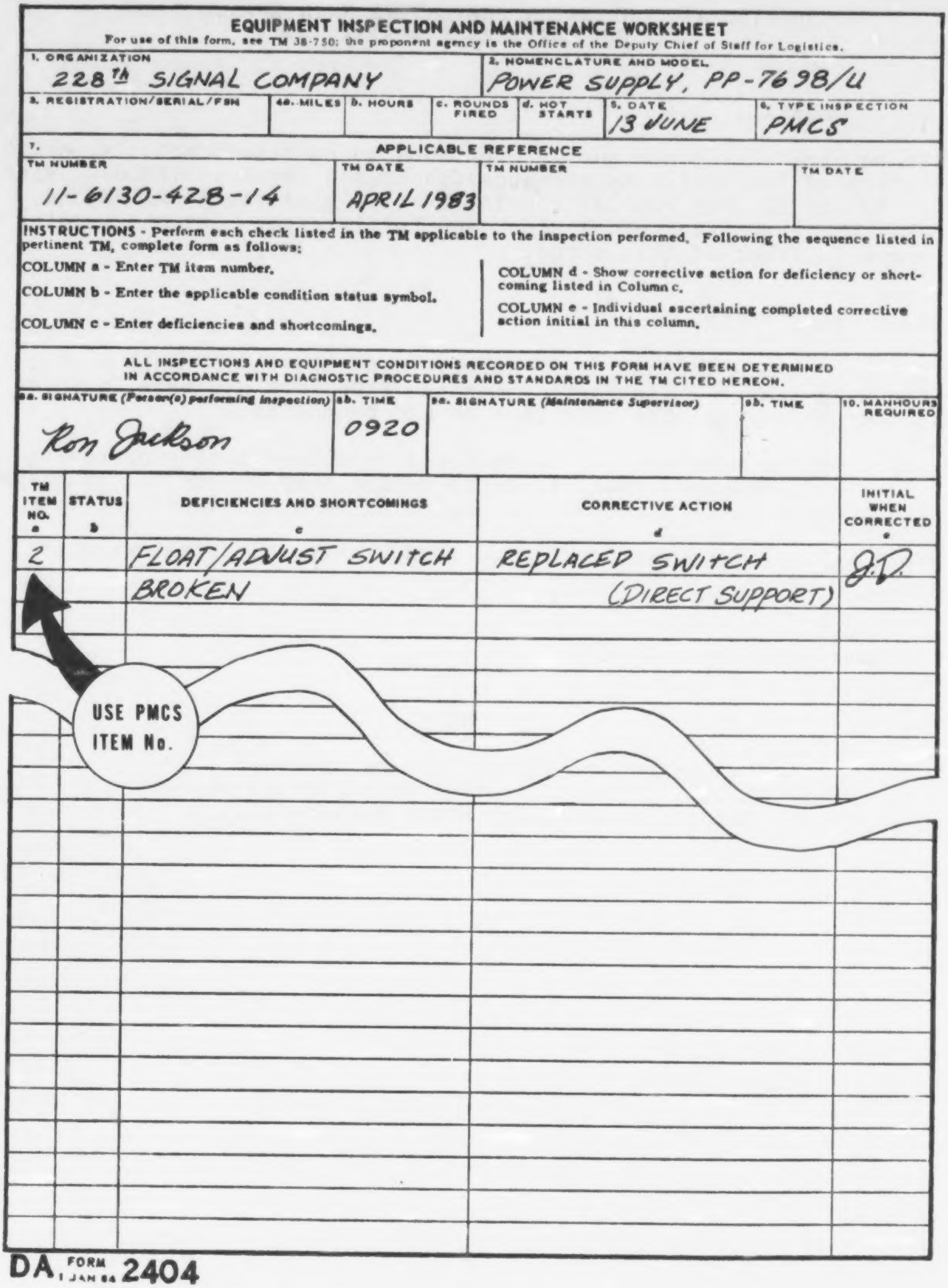
"D" -DURING OPERATION. D- PMCS are performed during operation to help you spot small troubles before they become big problems. Check these items at the beginning of a scheduled shift.

Routine checks are not listed as PMCS checks. The following are routine checks:

Dusting.
Storing items not in use.

NOTE

Use the PMCS TABLE to get the number for the TM ITEM NO. column of DA Form 2404 (Equipment Inspection and Maintenance Worksheet).



EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET

For use of this form, see TM 38-750; the proponent agency is the Office of the Deputy Chief of Staff for Logistics.

1. ORGANIZATION 228th SIGNAL COMPANY	2. NOMENCLATURE AND MODEL POWER SUPPLY, PP-7698/U

3. REGISTRATION/SERIAL/FSN	4a. MILES	b. HOURS	c. ROUNDS FIRED	d. HOT STARTS	5. DATE 13 JUNE	6. TYPE INSPECTION PMCS

7. APPLICABLE REFERENCE

TM NUMBER 11-6130-428-14	TM DATE APRIL 1983	TM NUMBER	TM DATE

INSTRUCTIONS - Perform each check listed in the TM applicable to the inspection performed. Following the sequence listed in pertinent TM, complete form as follows:

COLUMN a - Enter TM item number.

COLUMN b - Enter the applicable condition status symbol.

COLUMN c - Enter deficiencies and shortcomings.

COLUMN d - Show corrective action for deficiency or shortcoming listed in Column c.

COLUMN e - Individual ascertaining completed corrective action initial in this column.

ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.

8a. SIGNATURE (Person(s) performing inspection) Ron Jackson	8b. TIME 0920	9a. SIGNATURE (Maintenance Supervisor)	9b. TIME	10. MANHOURS REQUIRED

TM ITEM NO. a	STATUS b	DEFICIENCIES AND SHORTCOMINGS c	CORRECTIVE ACTION d	INITIAL WHEN CORRECTED e
2		FLOAT/ADJUST SWITCH	REPLACED SWITCH	J.D.
		BROKEN	(DIRECT SUPPORT)	

USE PMCS ITEM No.

DA FORM 1 JAN 64 2404

TABLE 2-1

OPERATOR'S PMCS TABLE

Item No.	Interval D	Item to be Inspected	Check and Have Repaired as Necessary	Equipment is not ready/available IF
1	●	Meters	Check for broken glass, bent pointers, or any other signs of internal meter damage.	
2	●	Switches	Visually check for broken or damaged switches. Do not turn any switches while power supply is operating just to check switch. Check for damaged switches each time the switch is used during operation.	
3	●	Cables and Connectors	Visually inspect cables and connectors. Do not touch any cable connections. Look for torn or frayed cable casings. Look for corrosion on cable connections.	

Section III. OPERATION UNDER USUAL CONDITIONS

2-7. GENERAL.

The power supplies are initially transported and installed by higher maintenance personnel. Direct support personnel are responsible for equipment maintenance. The operator is responsible for equipment operation. This section contains instructions for starting and operating the equipment.

2-8. INITIAL CHECKS.

WARNING

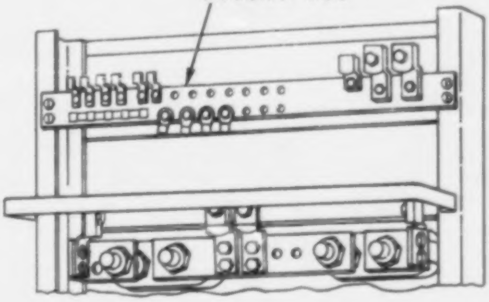
HIGH VOLTAGE
is used in this equipment.
DEATH ON CONTACT
MAY RESULT IF SAFETY PRECAUTIONS
ARE NOT OBSERVED

Never work on the power supply unless there is another person nearby who is familiar with the operation and hazards of this equipment, and who can administer first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, shut off power supply before doing any work on it. Ground every capacitor likely to hold a dangerous potential. When working inside the power supply, ground every part before touching it.

Make the following initial checks before starting the power system:

a. DC Power Ground - On the back of the power board, locate the yellow, or yellow wrapped, ground wire attached to the ground bus. Make sure that this connection is tight. Trace this ground wire back to where it is connected to station ground, and make sure that the connection is tight.



POWER BOARD (TOP REAR)

b. Power Cables - Make sure that all cable connections are secure.

c. Equipment - Inspect the power supply. Use Components of End Item List in Appendix B to be sure everything needed to operate the power supply is available. Check each item for damage. Report missing or damaged items to your supervisor.

d. Input Power - Make sure that site AC input power has been connected to power supply.

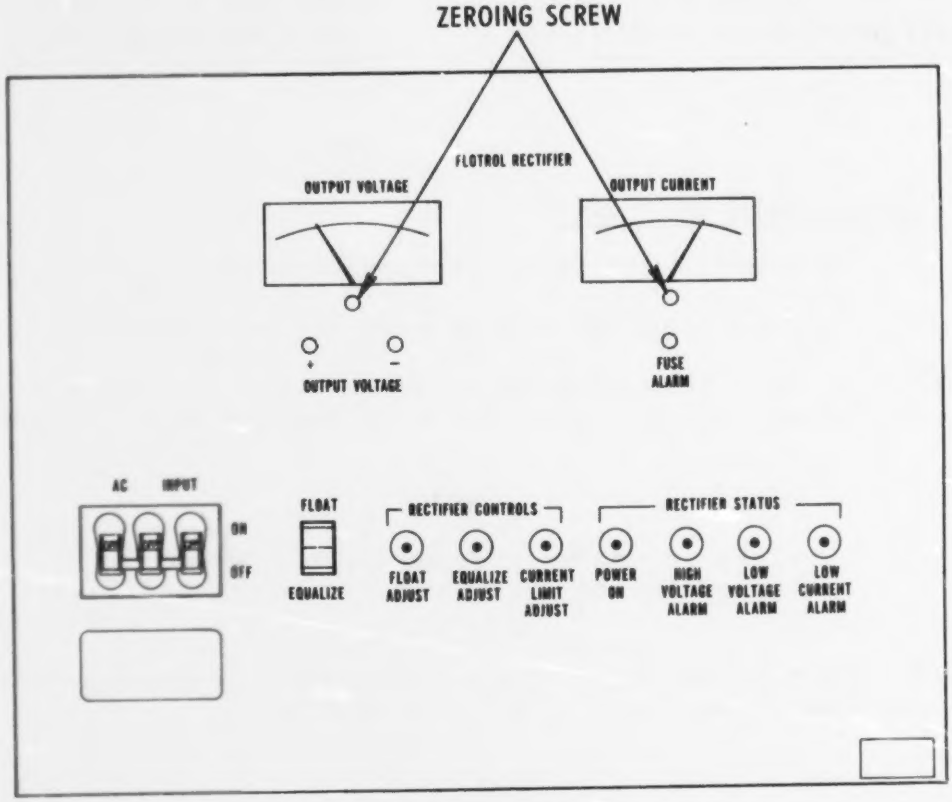
2-9. PRELIMINARY SWITCH POSITIONS.

a. Rectifier Controls.

(1) Make sure that AC INPUT switch on each rectifier is off.

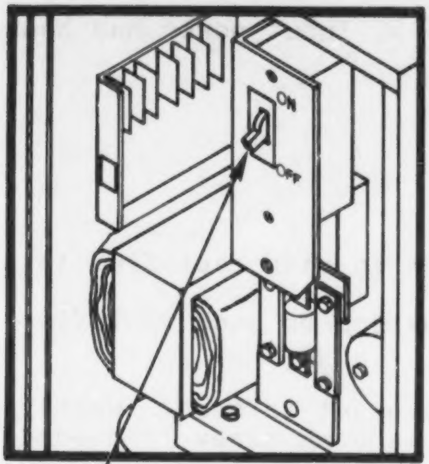
(2) Be sure that FLOAT/EQUALIZE switch on each rectifier is pushed to FLOAT.

(3) Be sure that meter pointers are set to zero. Gently adjust pointer position with zeroing screw if needed.

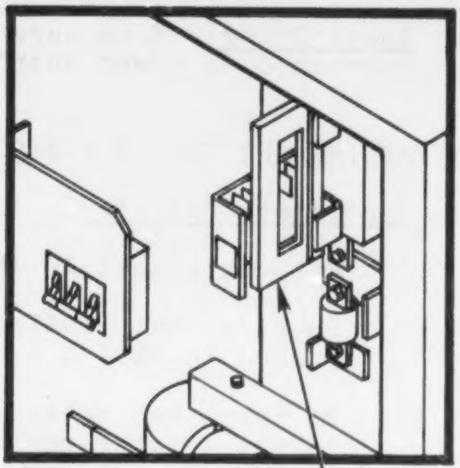

ZEROING SCREW
FLOTROL RECTIFIER
OUTPUT VOLTAGE
OUTPUT CURRENT
+
-
OUTPUT VOLTAGE
FUSE ALARM
AC INPUT
ON
OFF
FLOAT
EQUALIZE
RECTIFIER CONTROLS
FLOAT ADJUST
EQUALIZE ADJUST
CURRENT LIMIT ADJUST
RECTIFIER STATUS
POWER ON
HIGH VOLTAGE ALARM
LOW VOLTAGE ALARM
LOW CURRENT ALARM

RECTIFIER CONTROLS

(4) Open front door on each rectifier, and make sure that battery disconnect switch is on, or battery disconnect link is in place.



PP-7694/U THRU PP-7699/U
BATTERY DISCONNECT SWITCH



PP-7700/U AND PP-7701/U
BATTERY DISCONNECT LINK

b. Power Board Controls.

(1) Turn BAT/DISCH switch so arrow points to DISCH.

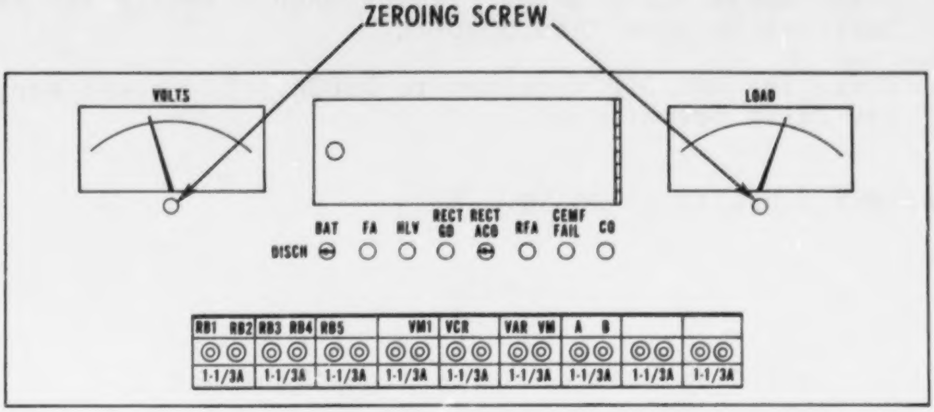
(2) Turn RECT/ACO switch so arrow is horizontal.

(3) Be sure that meter pointers are set at zero. Gently adjust pointer position with zeroing screw if needed.

NOTE

Item (4) is only found on Air Force power boards (see item 7 in paragraph 2-4).

(4) (Air Force only) Make sure that battery disconnect switch on front of power board is on.


ZEROING SCREW
VOLTS
LOAD
BAT
FA
HLV
RECT GO
RECT ACO
RFA
CEMF FAIL
CO
DISCH
RB1
RB2
RB3
RB4
RB5
VM1
VCR
VAR VM
A
B
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A

POWER BOARD CONTROLS

2-10. TURNING ON POWER.

NOTE

Refer to figures in paragraph 2-9 for rectifier control switch locations and power board control switch locations.

a. Be sure that main site AC power switch for each rectifier is set to ON.

b. Place each rectifier AC INPUT switch to ON. Observe the following:

  (1) The POWER ON lamp on each rectifier lights.

  (2) The OUTPUT VOLTAGE meter on each rectifier reads between 48 volts and 54 volts.

  (3) The VOLTS meter on power board reads the same as rectifier meters.

NOTE

The readings on rectifier OUTPUT CURRENT meter and power board LOAD meter will vary with load demand.

c. Place the BAT/DISCH switch to BAT. Observe the following:

(1) Power board VOLTS meter reading should remain the same, or increase no more than 3 volts.

(2) Place the BAT/DISCH switch to DISCH. The power supply is now fully operational.

2-11. BATTERY EQUALIZE CHARGING.

NOTE

Refer to figures in paragraph 2-9 for rectifier control switch locations and power board control switch locations.

a. If AC input power should fail, site battery will supply power to the load for a minimum of one hour.

b. When power supply is again operating on AC, the battery must be equalize charged. Proceed as follows:

(1) Push FLOAT/EQUALIZE switch on each rectifier to EQUALIZE.

(2) OUTPUT VOLTAGE meter on rectifier, and VOLTS meter on power board should read 55 volts ±3 volts.

(3) When rectifier OUTPUT CURRENT meter drops to zero, battery is fully charged, return FLOAT/EQUALIZE switch to FLOAT.

2-12. ALARM CIRCUITS.

NOTE

All alarm circuits may be connected to an external alarm system.

If power supply is equipped with an external alarm, audio portion of a rectifier failure alarm may be shut off by turning RECT/ACO switch so arrow is pointing up. RECT GD lamp will light to indicate that external alarm has been turned off.

2-13. STOPPING PROCEDURES.

a. Place the AC INPUT switch on each rectifier to OFF. This will shut off the complete system.

b. In an emergency, the system can be shut down by placing the central power source control switch for the site to OFF.

WARNING

If site power source has been turned off in an emergency shutdown, be sure to turn off AC INPUT switch on each rectifier. For additional safety information refer to warning pages at front of this manual.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-14. GENERAL.

There are no special operating instructions required for operation under unusual conditions. Refer to section III, Operation Under Usual Conditions.

CHAPTER 3

OPERATOR MAINTENANCE INSTRUCTIONS

	Paragraph		Paragraph
Cleaning	3-5	Troubleshooting	
Repair	3-4	General	3-1
Replacement of Fuses	3-3	Procedures	3-2

Section I. LUBRICATION INSTRUCTIONS

These power supplies do not require any lubrication.

Section II. TROUBLESHOOTING

3-1. GENERAL.

Operator maintenance consists of observing alarm lights or other signs of faulty operation, and replacing blown power board fuses.

3-2. TROUBLESHOOTING PROCEDURES.

a. Find the problem in the PROBLEM column of the troubleshooting table.

b. Use the steps in the INSPECTION OR TEST column, and take any CORRECTIVE ACTION steps to locate and correct the problem.

NOTE

This manual cannot list all problems that may occur, nor all tests or inspections to make. A problem that is not listed, or one that cannot be fixed by following these CORRECTIVE ACTION steps must have next higher maintenance perform troubleshooting to locate and correct the problem.

TABLE 3-1. OPERATOR'S TROUBLESHOOTING TABLE

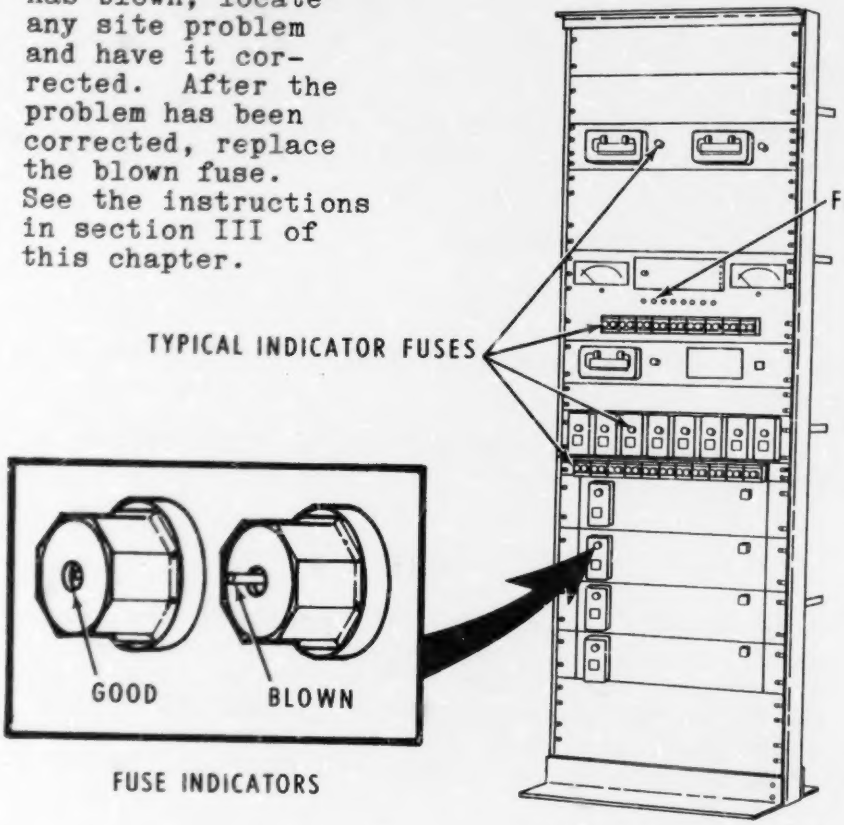
PROBLEM
    INSPECTION OR TEST
        CORRECTIVE ACTION

A. The power board FA (fuse alarm) is lit.

A power board fuse has blown. Check power board for a blown fuse. Its indicator fuse will have popped out. If a blown fuse cannot be found, notify organizational maintenance.

If a charge or discharge fuse has blown (indicator fuse next to it has popped out), notify organizational maintenance and have them check the power system and replace the fuse.

If any other fuse has blown, locate any site problem and have it corrected. After the problem has been corrected, replace the blown fuse. See the instructions in section III of this chapter.



FUSE INDICATORS

400AMP POWER BOARD

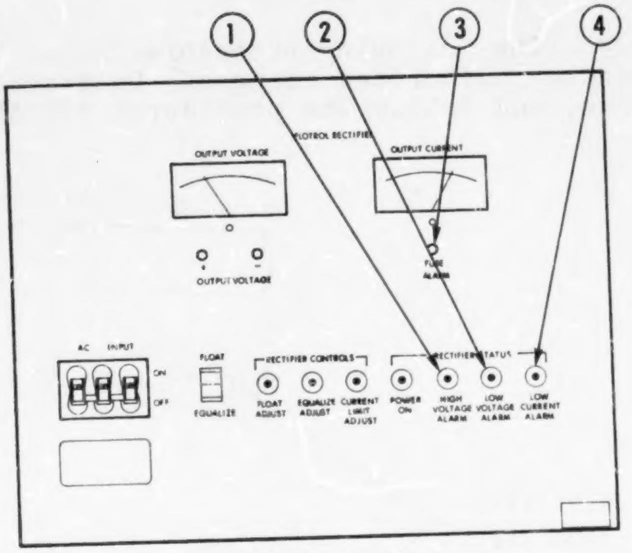
TABLE 3-1. OPERATOR'S TROUBLESHOOTING TABLE - CONTINUED

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

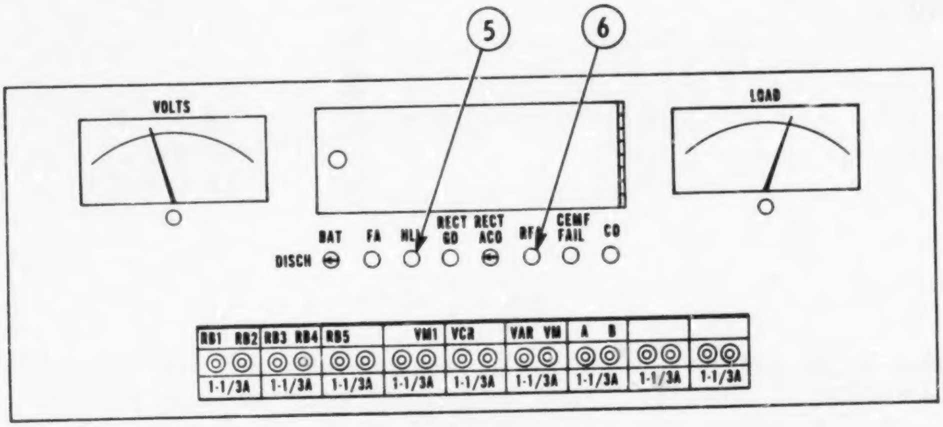
B. Any of the following alarm lamps are lit:

Rectifier HIGH VOLTAGE ALARM ①
Rectifier LOW VOLTAGE ALARM ②
Rectifier FUSE ALARM ③ (PP-7699/U & PP-7701/U only)
Rectifier LOW CURRENT ALARM ④
Power board HLV lamp ⑤
Power board RFA lamp ⑥

Have next higher maintenance locate and correct the problem.


1
2
3
4
FLOTROL RECTIFIER
OUTPUT VOLTAGE
OUTPUT CURRENT
+
−
OUTPUT VOLTAGE
FUSE ALARM
AC INPUT
ON
OFF
FLOAT
EQUALIZE
RECTIFIER CONTROLS
FLOAT ADJUST
EQUALIZE ADJUST
CURRENT LIMIT ADJUST
RECTIFIER STATUS
POWER ON
HIGH VOLTAGE ALARM
LOW VOLTAGE ALARM
LOW CURRENT ALARM

RECTIFIER CONTROLS


5
6
VOLTS
LOAD
DISCH
BAT
FA
HLV
RECT GD
RECT ACO
RFA
CEMF FAIL
CO
RB1
RB2
RB3
RB4
RB5
VM1
VCR
VAR
VM
A
B
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A

POWER BOARD CONTROLS

C. There is a 300 Hz or 360 Hz noise problem on site.

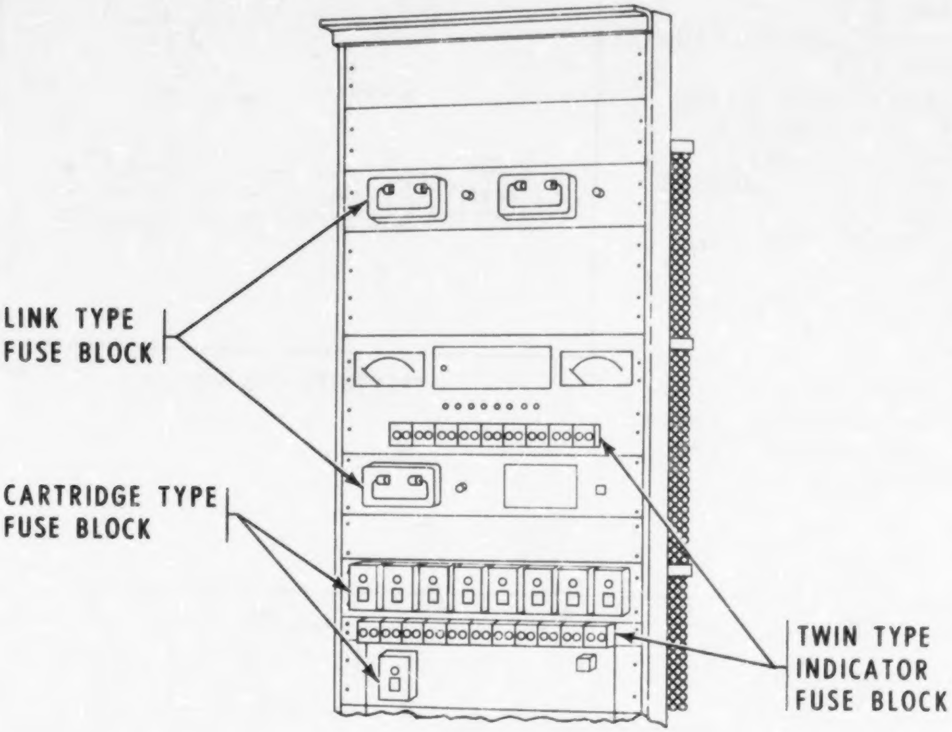
No inspection or test required.

Have next higher maintenance locate and correct the problem.

Section III. MAINTENANCE INSTRUCTIONS

3-3. REPLACEMENT OF FUSES.

a. The following procedures cover power board fuses which are operator authorized changes. Determine which type of fuse has blown, and follow the procedures for that type of fuse.


LINK TYPE FUSE BLOCK
CARTRIDGE TYPE FUSE BLOCK
TWIN TYPE INDICATOR FUSE BLOCK

NOTE

Operators are not authorized to replace a link type fuse block. Notify organizational maintenance and have them check and replace this type of fuse.

CARTRIDGE TYPE FUSE BLOCK

NOTE

Do not turn off rectifier AC INPUT power to replace this type of fuse.

b. To replace a cartridge fuse, follow these steps:

(1) Pull cartridge fuse holder out of power board.

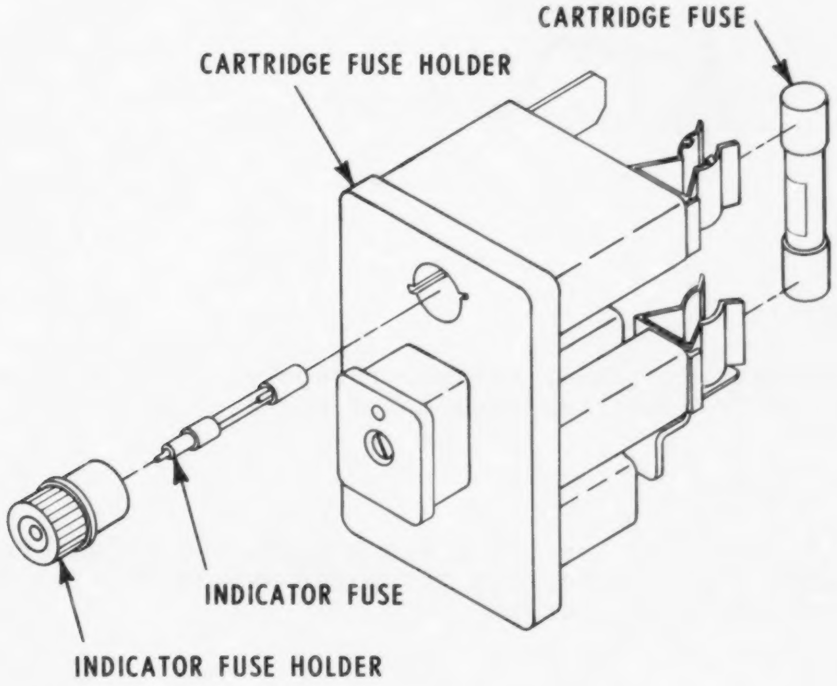
(2) Unscrew and remove indicator fuse holder from the front of cartridge fuse holder.

(3) Remove blown indicator fuse from indicator fuse holder, and install a new one. Make sure that rating of new fuse is correct.

(4) Screw indicator fuse holder back in place in cartridge fuse holder.

(5) Remove blown fuse from back of cartridge fuse holder, and install a new fuse. Make sure that rating of new fuse is correct.

(6) Push cartridge fuse holder back into power board.


CARTRIDGE FUSE
CARTRIDGE FUSE HOLDER
INDICATOR FUSE
INDICATOR FUSE HOLDER

TWIN TYPE INDICATOR FUSE BLOCK

NOTE

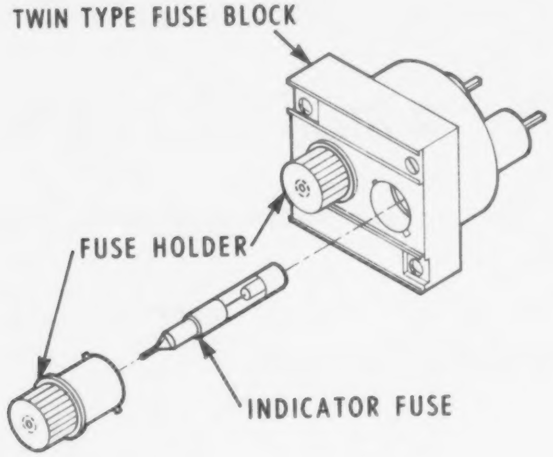
Do not turn off rectifier AC INPUT power to replace this type of fuse.

c. To replace this type fuse, follow these steps:

(1) Unscrew and remove indicator fuse holder.

(2) Remove blown fuse from holder, and install a new one. Make sure that rating of new fuse is correct.

(3) Screw holder back in place in power board.



3-4. REPAIR.

Do not attempt to repair the power supply. If any repairs are needed, notify organizational maintenance.

3-5. CLEANING.

Do not attempt to clean the power supply. It is an organizational maintenance function to keep the power supply free of oil, dust, grease, moisture, or fungus.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

	Paragraph
Cleaning	4-11
Common Tools and Equipment	4-1
Inspection	4-12
Organizational Maintenance Procedures; General	4-9
Operational Checks	4-10
Painting	4-14
Organizational PMCS; General	4-5
PMCS Table	4-7
Preparation for Storage or Shipment; General	4-15
Repair Parts	4-3
Replacement of Power Board Charge or Discharge Fuse	4-13
Service upon Receipt; General	4-4
Special Tools, TMDE, and Support Equipment	4-2
Tools, Test Equipment, and Material Needed for Organizational PMCS	4-6
Troubleshooting; General	4-8

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

4-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Maintenance Allocation Chart in appendix D, section III.

4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

No special tools, TMDE, or support equipment are required for organizational maintenance.

4-3. REPAIR PARTS.

Organizational level repair parts are illustrated and listed in TM 11-6130-428-24P/TO 35C1-2-844-4, Repair Parts and Special Tools List (RPSTL).

Section II. SERVICE UPON RECEIPT

4-4. GENERAL.

The power supply was originally installed and adjusted by an equipment installation team. Replacing a power board or rectifier will be done by direct support maintenance, or an installation team.

Section III. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-5. GENERAL.

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent trouble from developing. The procedures given in the PMCS Table explain the routine care and cleaning necessary for proper upkeep and operation of the power supply, and site battery. See DA PAM 738-750, Maintenance Management Update, for an explanation of any maintenance forms or records to be maintained. Perform all checks and services in the order given in the PMCS table.

4-6. TOOLS, TEST EQUIPMENT, AND MATERIALS NEEDED FOR ORGANIZATIONAL LEVEL PMCS.

a. No tools are needed.

b. Required test equipment (Appendix C):

Hydrometer, (NSN 6630-00-580-4884)
Thermometer, (NSN 6685-00-803-6421)
Digital Multimeter, (NSN 6625-01-010-0088)

c. Required material (Appendix E):

Lint free cheese cloth (NSN 8305-00-267-3015)
General Purpose Detergent (NSN 7930-00-357-7386)

4-7. PMCS TABLE.

The preventive maintenance checks and services described in the PMCS table give the tasks to be performed at specific intervals. These checks and services are necessary to keep the power supply and site battery in good condition. The table indicates what items must be checked, how and when to check them, and any corrective action to be taken.

These checks and services must be done by organizational maintenance personnel on a daily (D), weekly (W), quarterly (Q), and annually (A) basis.

If unable to get a correct reading in one of the checks in the PMCS table, notify direct support maintenance and have them check the power supply.

TABLE 4-1

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Item No.	Interval				Item to be Inspected	Procedures
	W	M	Q	A		
1	●				Battery	On power board, observe VOLTS meter while turning BAT/DISCH switch to BAT. Power board VOLTS meter reading should remain the same, or go up no more than 3.0 volts. Record the VOLTS meter reading in the power supply record book. Turn BAT/DISCH switch back to DISCH.
2	●				Battery	Check water level in each cell. Add water if necessary.
3	●				Battery	Check voltage, specific gravity, and temperature of pilot cell (see item No 4). Record each reading. Cell voltage = 2.17 V - 2.23 V (with rectifier operating) Cell specific gravity (corrected to 77 degrees F) = 1.205 - 1.215
4		●			Battery	Check voltage, specific gravity, and temperature of each cell in battery. Correct each specific gravity reading to 77 degrees F. Record all readings. Battery must be equalize charged if any cell reads 0.05 volts different than any other cell. Compare the readings with past readings to see if any battery problems are developing. Cell with lowest specific gravity will be pilot cell for the next month.
5			●		Battery	Clean all cells, and check each cell for abnormal appearance when compared with other cells.
6				●	Rectifier Failure Alarm Test	Shut off AC INPUT switch on one of the rectifiers. RFA alarm light on power board should go on. Turn AC INPUT switch back on. RFA alarm light should go out. Repeat this test for the other rectifier.

TABLE 4-1

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONTINUED)

Item No.	Interval				Item to be Inspected	Procedures
	D	W	Q	A		
7				●	Low Voltage Alarm Test	Shut off AC INPUT switch on all rectifiers. Record time that rectifiers were shut off. Record power board LOAD meter reading. Check and record load meter reading every 30 minutes until power board HLV alarm comes on. **NOTE** HLV alarm should not come on in less than one hour. Record the following three items: time that HLV alarm came on, power board LOAD meter reading, and VOLTS meter reading. Turn rectifier AC INPUT switches back on, and equalize charge the site batteries. When HLV alarm came on, VOLTS meter reading should have been 46 ±.5 V. If reading was not correct, have direct support maintenance adjust the low voltage alarm system. Find the average current for the shut off period (add all LOAD meter readings together, and divide by number of readings). Multiply average current by the total time (in hours) that the system was on battery power. This figure gives ampere-hours (AH), and is a measure of battery capacity to provide power to a load. Capacity of system battery should be at least: PP-7694/U - 121 ampere-hours min PP-7695/U - 243 ampere-hours min PP-7696/U - 460 ampere-hours min PP-7697/U - 243 ampere-hours min PP-7698/U - 243 ampere-hours min PP-7699/U - 460 ampere-hours min PP-7700/U - 924 ampere-hours min PP-7701/U - 924 ampere-hours min

TABLE 4-1

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONTINUED)

Item No.	Interval				Item to be Inspected	Procedures
	D	W	Q	A		
						If figure is not correct, notify direct support maintenance and have the site battery system checked.
8				●	Publications	Check power supply publications against DA Pam 310-1 to see if there are any new editions, changes, or additional publications on the power supply. All TM's should be complete, up to date, and servicable.
9				●	Modifications	Check DA Pam 310-1 to be sure that all applicable MWO have been applied to the power supply.

Section IV. TROUBLESHOOTING

4-8. GENERAL.

a. This section contains the organizational troubleshooting instructions for these power supplies. It includes only those steps which the MAC authorizes for organizational maintenance. Notify direct support maintenance for all other problems. The tests and inspections for each problem should be done in the order given. If the problem can not be corrected by following these steps, notify direct support maintenance. Organizational maintenance for these power supplies consists of the following tasks:

(1) External inspection and cleaning.

(2) Troubleshooting based on alarm conditions.

b. Troubleshooting Table Procedures.

(1) Verify the operator's reported problem, A through G.

(2) Follow the steps in the INSPECTION OR TEST column, and take any CORRECTIVE ACTION steps until problem is located and corrected, or until told to report the problem to next higher maintenance.

(3) This manual cannot list all the problems that may occur, nor everything to check, nor all possible procedures which may correct a problem. If a problem is not listed in the table, or is not corrected by the procedures given under CORRECTIVE ACTION, notify direct support maintenance.

ORGANIZATIONAL TROUBLESHOOTING INDEX

PROBLEM	INDEX LETTER
There is a power board HLV alarm. (Other alarms may be on.)	A
There is a power board RFA alarm. (Other alarms may be on.)	B
There is a rectifier HIGH VOLTAGE ALARM. (No other alarms are on.)	C
There is a rectifier LOW VOLTAGE ALARM. (No other alarms are on.)	D
There is a rectifier FUSE ALARM. (PP-7699/U and PP-7701/U only.) (No other alarms are on.)	E
There is a power board FA alarm. (RFA alarm may also be on.)	F
There is a 300 Hz or 360 Hz noise problem on site	G

TABLE 4-2. ORGANIZATIONAL TROUBLESHOOTING TABLE

PROBLEM
    INSPECTION OR TEST
        CORRECTIVE ACTION

A. There is a power board HLV alarm. (Other alarms may also be on.)

Step 1. Does power board VOLTS meter read more than 54.5 V?

No - go to step 2.

Yes - go to step 3.

Step 2. Does power board VOLTS meter read less than 46.0 V?

Yes - go to step 16.

No - HLV alarm circuit is faulty. Notify direct support maintenance.

Step 3. Is there a rectifier HIGH VOLTAGE ALARM?

No - go to step 4.

Yes - rectifier has a high voltage problem. Shut off alarming rectifier, and notify direct support maintenance.

Step 4. Are rectifier FLOAT/EQUALIZE switches in FLOAT?

No - go to step 14.

Yes - go to step 5.

Step 5. Does either rectifier have a LOW CURRENT ALARM?

Yes - go to step 9.

No - go to step 6.

Step 6. Check power board voltmeter reading with BAT/DISCH switch in BAT position, then in DISCH position. Is there a difference of at least 1 volt between the two readings?

Yes - A rectifier is faulty. Go to step 8.

No - go to step 7.

Step 7. Voltage control relay is faulty.

Notify direct support maintenance.

TABLE 4-2. ORGANIZATIONAL TROUBLESHOOTING TABLE (CONTINUED)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 8. Turn off one of the rectifiers. Does the HLV alarm go out?

Yes - go to step 10.

No - go to step 11.

Step 9. Shut off rectifier that does NOT have a LOW CURRENT ALARM. Does power board HLV alarm go out?

Yes - go to step 10.

No - go to step 12.

Step 10. Rectifier that was turned off is faulty.

Leave rectifier off, and go to step 13.

Step 11. Rectifier that was not turned off is faulty.

Turn rectifier back on, and turn other (faulty) rectifier off. Go to step 13.

Step 12. Both rectifiers are faulty.

Go to step 13.

Step 13. The faulty rectifier has two problems: output voltage is high, and high voltage alarm circuit is not operating.

Notify direct support maintenance to correct high output voltage problem first. Then correct alarm circuit problem.

Step 14. Push FLOAT/EQUALIZE switches to FLOAT. Does the HLV alarm go out?

Yes - go to step 15.

No - rectifier is faulty. Notify direct support maintenance.

Step 15. Power board control voltage relay circuit is faulty.

Notify direct support maintenance.

TABLE 4-2. ORGANIZATIONAL TROUBLESHOOTING TABLE (CONTINUED)

PROBLEM
INSPECTION OR TEST
CORRECTIVE ACTION

Step 16. Is AC input power on?

Yes - go to step 17.

No - site battery is low. Equalize charge the battery.

Step 17. Has AC power just been restored after an outage?

No - go to step 18.

Yes - Alarm is normal. Following a period of battery discharge, rectifiers may automatically limit output current by decreasing output voltage. Allow battery to recharge.

Step 18. Is power supply a 400 amp model (PP-7700/U or PP-7701/U)?

No - go to step 20.

Yes - rectifier may have automatically shut off because it is too hot. See if fans in bottom of rectifier cabinet are running. Feel base of cabinet for vibration and listen for fan motor. Compare sound and vibration of alarming rectifier to other rectifiers.

Step 19. Are fans running?

Yes - go to step 20.

No - rectifier fan cooling system is faulty. Notify direct support maintenance.

NOTE

Rectifier should automatically return to full operation after it has cooled.

Step 20. Rectifier has a low voltage problem.

Notify direct support maintenance.

TABLE 4-2. ORGANIZATIONAL TROUBLESHOOTING TABLE (CONTINUED)

PROBLEM
    INSPECTION OR TEST
        CORRECTIVE ACTION

B. There is a power board RFA alarm. (Other alarms may be on.)

Step 1. Is site AC power on?

Yes - go to step 2.

No - alarm is normal. End troubleshooting.

Step 2. Check the power board LOAD meter. Is the reading zero?

No - go to step 3.

Yes - rectifiers have no load, and RFA alarm is normal. End troubleshooting.

Step 3. Locate site circuit breakers that control power to the rectifiers. Turn circuit breakers OFF, and back on. Will rectifiers restart?

No - go to step 4.

Yes - end troubleshooting.

Step 4. Turn alarming rectifier AC INPUT switch OFF and back ON. Did rectifier restart?

Yes - end troubleshooting.

No - rectifier is faulty. Notify direct support maintenance.

C. There is a rectifier HIGH VOLTAGE ALARM. (No other alarms are on.)

Rectifier high voltage alarm circuit is faulty.

Notify direct support maintenance.

TABLE 4-2. ORGANIZATIONAL TROUBLESHOOTING TABLE (CONTINUED)

PROBLEM
  INSPECTION OR TEST
    CORRECTIVE ACTION

D. There is a rectifier LOW VOLTAGE ALARM. (No other alarms are on.)

Rectifier low voltage alarm circuit is faulty.

Notify direct support maintenance.

E. There is a rectifier FUSE ALARM (PP-7699/U and PP-7701/U only). (No other alarms are on.)

No inspection or test required.

Notify direct support maintenance.

F. There is a power board FA alarm (RFA alarm may also be on).

Step 1. Has a power board charge or discharge fuse blown (check its indicator fuse)?

No - go to step 2.

Yes - Replace blown fuse (See paragraph 4-13 for procedures).

Step 2. Check all remaining power board fuses. Has a fuse blown?

No - go to step 3.

Yes - Replace blown fuse.

Step 3. Power board fuse alarm circuit is faulty.

Notify direct support maintenance.

G. There is a 300 Hz or 360 Hz noise problem on site.

No inspection or test required.

Notify direct support maintenance.

Section V. ORGANIZATIONAL MAINTENANCE PROCEDURES.

4-9. GENERAL.

Organizational maintenance of power supplies PP-7694/U through PP-7701/U is limited to:

a. Operational checks after restart.

b. Inspection of exterior surfaces.

c. Replacement of power board charge and discharge fuses.

d. Cleaning of exterior surfaces.

e. Touch-up Painting.

4-10. OPERATIONAL CHECKS.

Make the following operational checks after restarting the power supply.

NOTE

If you do not get the correct meter readings, notify direct support maintenance.

a. Power board VOLTS meter reads 53 volts ±2 volts in FLOAT, or 55 volts ±3 volts in EQUALIZE.

b. All rectifier OUTPUT CURRENT meters read approximately the same.

c. The sum of the rectifier OUTPUT CURRENT meter readings will equal power board LOAD meter reading. For example, a power supply with two rectifiers and a 100 amp load will read:

Power board LOAD meter - 100 amps.
Each rectifier OUTPUT CURRENT meter - 50 amps.

4-11. CLEANING.

WARNING

Remember that power supply is operating. Do not use an excessive amount of special purpose detergent when cleaning. When power supply is wet, the potential for a fatal electric shock is much greater.

WARNING

Trichlorotrifluoroethene IS NOT AUTHORIZED to be used as a cleaning agent for these power supplies.

Do NOT attempt to clean back of power board, or inside the rectifiers. For additional safety infromation refer to warning pages at front of this manual.

CAUTION

Do not press on meter face when cleaning power supply. Meter may be damaged.

Do not accidently change any switch settings while cleaning the power supply.

a. The outside of the power supply should be kept clean, and free of dirt, dust, grease, and fungus.

b. Use a clean, lint free cheese cloth (item 2, appendix E), and a general purpose detergent (item 3, appendix E) to clean exterior surfaces of power supply.

CAUTION

Compressed air IS NOT AUTHORIZED to dry the power supply after cleaning.

4-12. INSPECTION.

WARNING

Hazardous voltages are present inside power supply. For additional safety information refer to warning pages at front of this manual.

Visually inspect the interior and exterior of power board and rectifier for any signs of damage.

4-13. REPLACEMENT OF POWER BOARD CHARGE OR DISCHARGE FUSE.

a. Turn OFF the AC INPUT switch on each rectifier.

b. Pull the fuse block out of power board.

c. Remove the two screws and washers that hold fuse link to back of fuse block. Remove any pieces of blown link.

d. Install a new fuse link in fuse block. Check list below for correct link for your power supply.

PP-7694/U - 80 A
PP-7695/U - 150 A
PP-7696/U - 300 A
PP-7697/U - 150 A
PP-7698/U - 150 A
PP-7699/U - 300 A
PP-7700/U - 600 A
PP-7701/U - 600 A

e. Secure fuse with two screws and washers. Make sure they are tight.

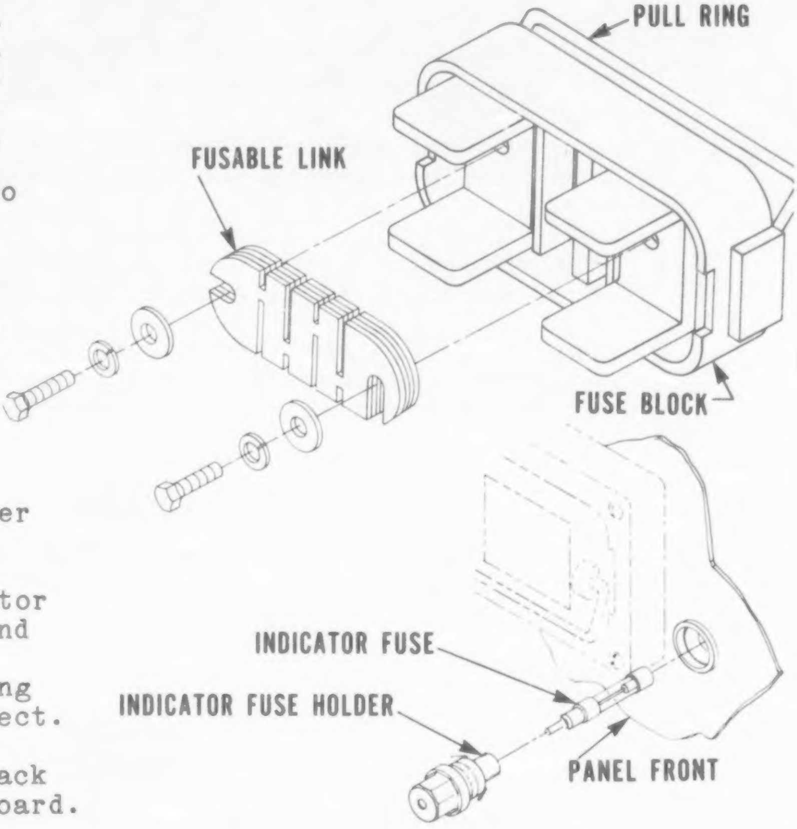
f. Put fuse block back in power board by pushing it all the way in.

g. Unscrew and remove indicator fuse holder next to fuse block.

h. Remove blown indicator fuse from holder, and install a new one. Make sure that rating of new fuse is correct.

i. Screw fuse holder back in place in power board.

j. Turn ON the AC INPUT switch on each rectifier.



4-14. PAINTING.

Painting at organizational level consists of the following touch-up procedures.

a. Use 4/0 sandpaper (appendix E, item 6) to remove any rust or corrosion from the power supply.

b. Use clean, lint-free cheese cloth (appendix E, item 2) to clean any dust, dirt, or moisture from area to be painted.

c. Apply two coats of primer to area to be painted using brush (appendix E, item 1) and paint (appendix E, item 5).

d. Brush on two thin coats of light gray paint, formula No. 111, type I, class 2 (appendix E, item 4).

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

4-15. GENERAL.

Preparation for storage or shipment will not be done by organizational maintenance. Notify direct support maintenance.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

	Paragraph
Acceptance/Rejection Criteria	5-20
Adjusting a Repaired Power Supply	5-22
Administrative Storage	5-26
Cleaning	5-19
Common Tools and Equipment	5-1
Inspection Procedures	5-17
Installation of Units	5-5
Maintenance Operations	5-15
Marking	5-25
Operational Checks	5-16
Painting	5-21
Packing	5-24
Rectifier Checks and Adjustments	5-6
Repair Parts	5-3
Replacement of Components	5-18
Service upon Receipt of Material	5-4
Special Tools, TMDE, and Materials	5-2
Startup and Checkout	5-8
Technical Principles of Operation:	
General	5-9
Power Board	5-10
Rectifier	5-11
Test Equipment	5-13
Testing a Repaired Power Supply	5-23
Troubleshooting; General	5-12
Troubleshooting Table and Index	5-14
Wiring a Power Supply	5-7

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

5-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to the unit.

5-2. SPECIAL TOOLS, TMDE, AND MATERIALS.

All special tools and equipment required for power supply maintenance will be found in the maintenance allocation chart (appendix D) and the additional authorization list (appendix C).

5-3. REPAIR PARTS.

For repair parts, refer to TM 11-6130-428-24P/TO 35C1-2-844-4 Repair Parts and Special Tools List (RPSTL).

Section II. SERVICE UPON RECEIPT

This section gives general information on unpacking, inspecting, installing, adjusting, and testing components of a power supply.

5-4. SERVICE UPON RECEIPT OF MATERIAL.

WARNING

HEAVY EQUIPMENT

Don't take chances. Avoid personal injury. A power board or rectifier is heavy - it weighs 500-1000 pounds depending on the model. Use a mechanical lift.

a. Carefully unpack the unit.

b. Inspect equipment to see if any damage occured during shipment. Refer to paragraph 1-3 for information on reporting damage.

c. Check equipment against packing slip to see if shipment is complete. Report all discrepancies as instructed in DA PAM 738-750. Refer to paragraph 1-3 for information on reporting discrepancies.

d. Check to see whether equipment has been modified. Also be sure that all current MWO's have been applied. Refer to the latest issue of DA Pam 310-1 for published MWOs.

5-5. INSTALLATION OF UNITS.

Power supplies will normally be installed by a depot and/or contractor equipment installation tean.

5-6. RECTIFIER CHECKS AND ADJUSTMENTS.

a. Internal AC Wiring Adjustments. Rectifier internal wiring must be adjusted for site voltage before power is connected to the rectifier. Rewire transformer for site voltage as shown below.

(1) Locate the correct power supply in the tables below.

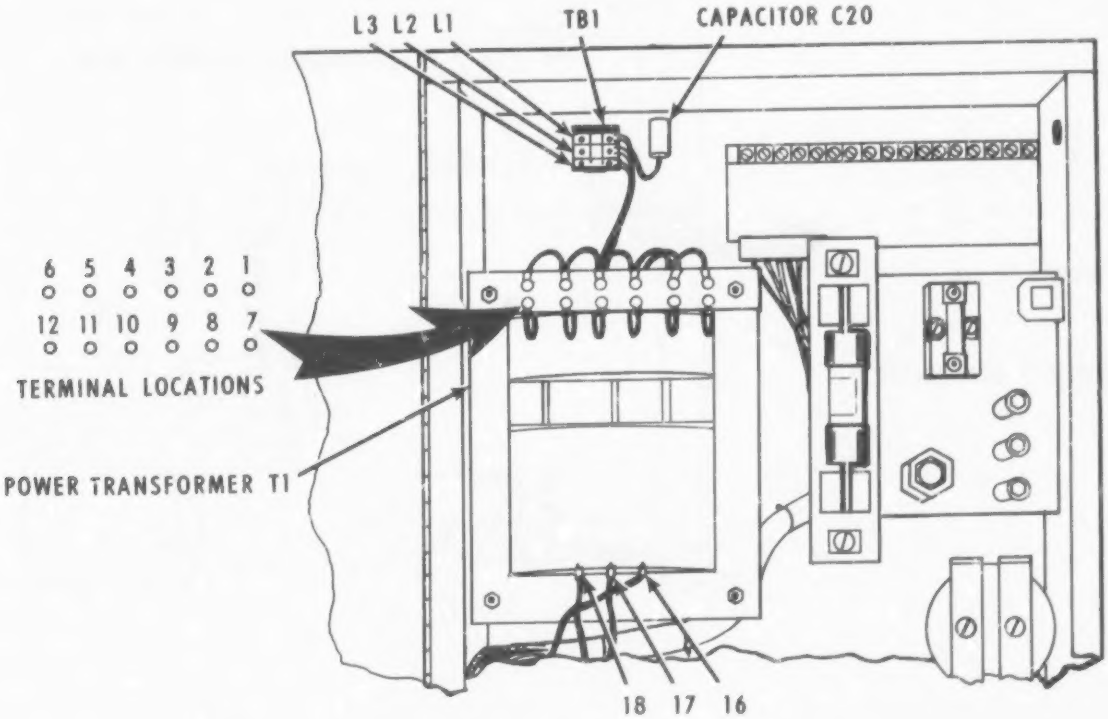
(2) On the table, locate the correct nominal input voltage for the site.

(3) Make sure that the leads given in the table are connected to the correct transformer terminals as per the table. Move wires if required.

Power Supply PP-7694/U:

	Power transformer T1 connection terminals			Terminal board TB1 connection terminals			Capacitor C20 connection to TB1 terminals	
Nominal input voltage	Lead C (two wires)	Lead E	Lead F	Lead A	Lead B	Lead C	WH Lead	BK Lead
120 VAC	5 & 11	7	1	L1	L1	L3	L3	L1
127 VAC	6 & 12	7	1	L1	L1	L3	L3	L1
208 VAC	2 & 7	8	1	L1	L2	L3	L2	L1
220 VAC	3 & 7	9	1	L1	L2	L3	L2	L1
230 VAC	4 & 7	10	1	L1	L2	L3	L2	L1
240 VAC	5 & 7	11	1	L1	L2	L3	L2	L1

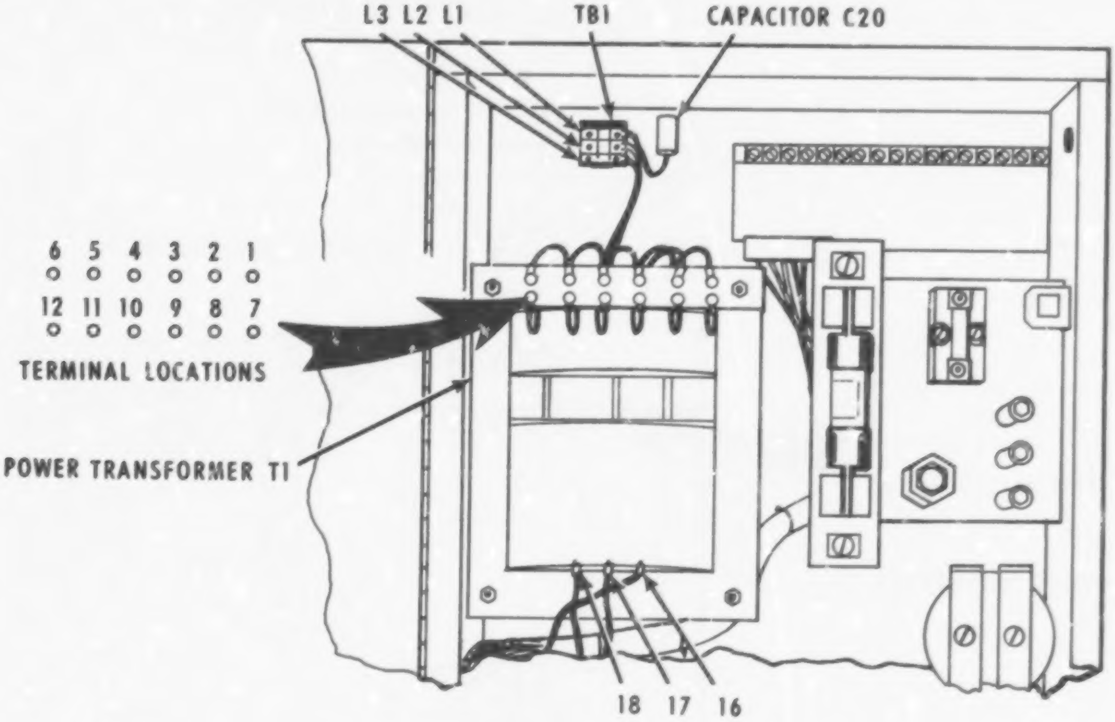
50 Hz - connect BK lead to terminal 18 of transformer T1.
60 Hz - connect BK lead to terminal 17 of transformer T1.


L3 L2 L1
TB1
CAPACITOR C20
6 5 4 3 2 1
12 11 10 9 8 7
TERMINAL LOCATIONS
POWER TRANSFORMER T1
18 17 16

Power Supply PP-7697/U:

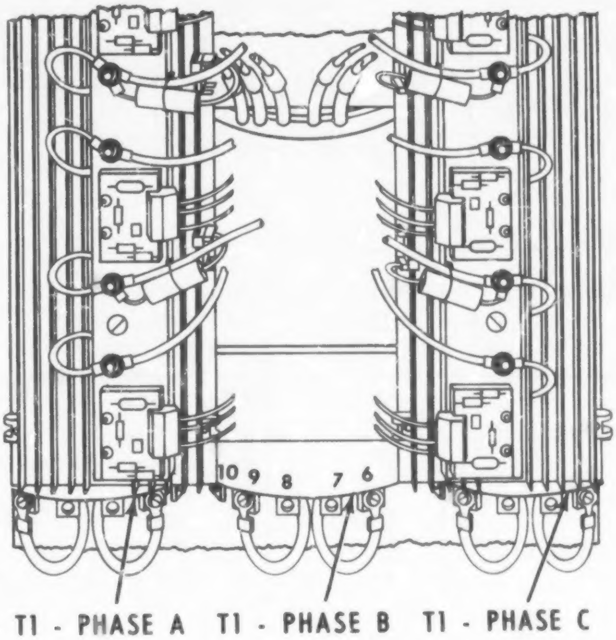
	Power transformer T1 connection terminals			Terminal board TB1 connection terminals			Capacitor C20 connection to TB1 terminals	
Nominal input voltage	Lead C (two wires)	Lead E	Lead F	Lead A	Lead B	Lead C	WH Lead	BK Lead
120 VAC	5 & 12	8	1	L1	L1	L3	L3	L1
127 VAC	6 & 12	7	1	L1	L1	L3	L3	L1
208 VAC	2 & 11	12	1	L1	L2	L3	L2	L1
220 VAC	3 & 10	12	1	L1	L2	L3	L2	L1
230 VAC	4 & 9	12	1	L1	L2	L3	L2	L1
240 VAC	5 & 8	12	1	L1	L2	L3	L2	L1

50 Hz - connect BK lead to terminal 17 of transformer T1.
60 Hz - connect BK lead to terminal 16 of transformer T1.


L3 L2 L1
TB1
CAPACITOR C20
6 5 4 3 2 1
12 11 10 9 8 7
TERMINAL LOCATIONS
POWER TRANSFORMER T1
18 17 16

Power Supply PP-7695/U:

Nominal input voltage	Connect lead labled	To transformer T1
380 VAC	F	ØA, Term 7
	D	ØB, Term 7
	E	ØC, Term 7
400 VAC	F	ØA, Term 8
	D	ØB, Term 8
	E	ØC, Term 8
415 VAC	F	ØA, Term 9
	D	ØB, Term 9
	E	ØC, Term 9



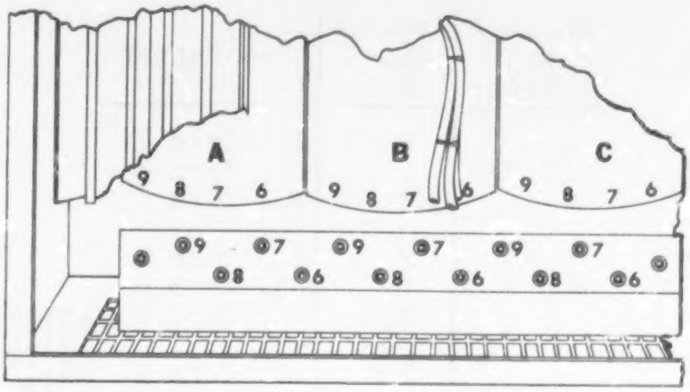
BASE OF RECTIFIER

Power Supply PP-7698/U:

Nominal input voltage	Connect lead labled	To transformer T1
208 VAC	F	ØA, Term 7
	D	ØB, Term 7
	E	ØC, Term 7
220 VAC	F	ØA, Term 8
	D	ØB, Term 8
	E	ØC, Term 8
230 VAC	F	ØA, Term 9
	D	ØB, Term 9
	E	ØC, Term 9
240 VAC	F	ØA, Term 10
	D	ØB, Term 10
	E	ØC, Term 10

Power Supply PP-7696/U:

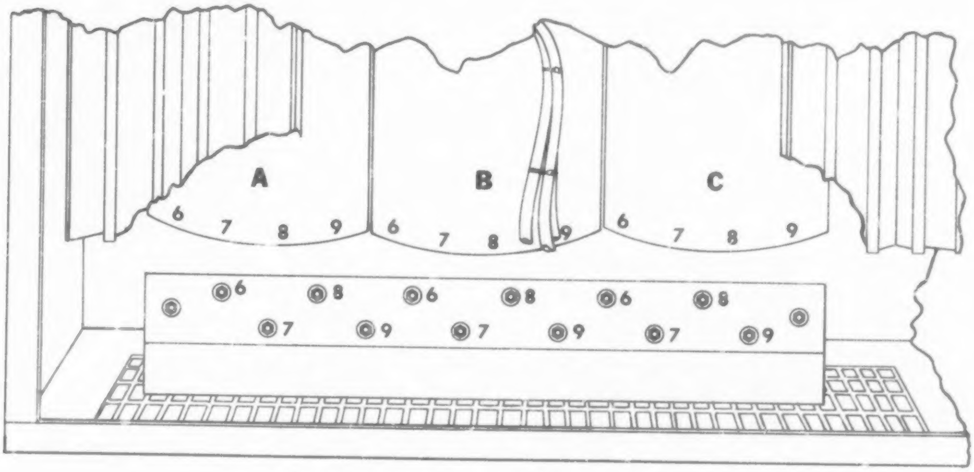
Nominal input voltage	Connect lead labled	To transformer T1
380 VAC	F D E	ØA, Term 7 ØB, Term 7 ØC, Term 7
400 VAC	F D E	ØA, Term 8 ØB, Term 8 ØC, Term 8
415 VAC	F D E	ØA, Term 9 ØB, Term 9 ØC, Term 9


A
B
C
9 8 7 6
9 8 7 6
9 8 7 6
9 7 9 7 9 7
8 6 8 6 8 6

BASE OF RECTIFIER PP-7696/U

Power Supply PP-7699/U:

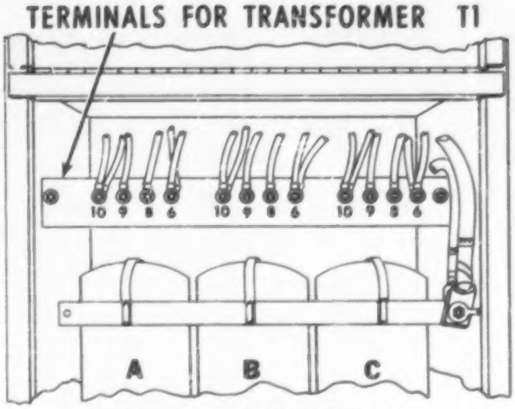
Nominal input voltage	Connect jumper labeled	Between the following terminals of transformer T1
208 VAC	D E F	ØA, Term 6 to ØB Term 7 ØB, Term 6 to ØC Term 7 ØC, Term 6 to ØA Term 7
240 VAC	D E F	ØA, Term 6 to ØB Term 8 ØB, Term 6 to ØC Term 8 ØC, Term 6 to ØA Term 8


A
B
C
6 7 8 9
6 7 8 9
6 7 8 9
6 8 6 8 6 8
7 9 7 9 7 9

BASE OF RECTIFIER PP-7699/U

Power Supply PP-7700/U:

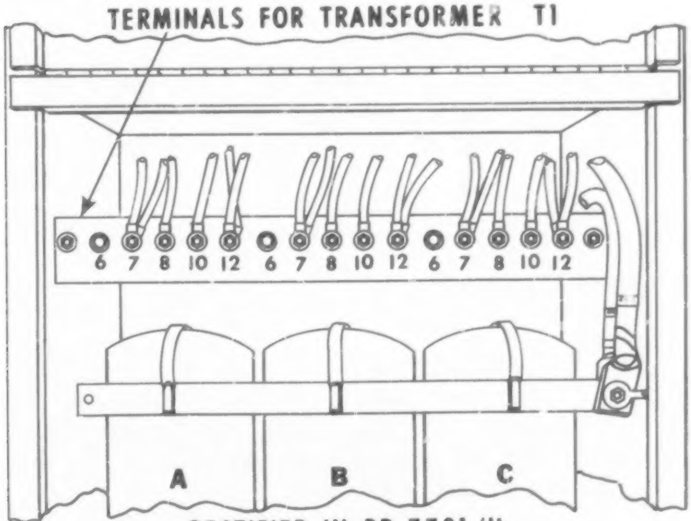
Nominal input voltage	Connect lead labled	To transformer T1
380 VAC	G	ØA, Term 8
	I	ØB, Term 8
	H	ØC, Term 8
400 VAC	G	ØA, Term 9
	I	ØB, Term 9
	H	ØC, Term 9
415 VAC	G	ØA, Term 10
	I	ØB, Term 10
	H	ØC, Term 10


TERMINALS FOR TRANSFORMER T1
10
9
8
6
10
9
8
6
10
9
8
6
A
B
C

RECTIFIER IN PP-7700/U

Power Supply PP-7701/U:

Nominal input voltage	Connect jumper labeled	Between the following terminals of transformer T1
208 VAC	G	ØA, Term 9 to ØC Term 7
	H	ØB, Term 9 to ØA Term 7
	I	ØC, Term 9 to ØB Term 7
240 VAC	G	ØA, Term 9 to ØC Term 6
	H	ØB, Term 9 to ØA Term 6
	I	ØC, Term 9 to ØB Term 6


TERMINALS FOR TRANSFORMER T1
6
7
8
10
12
6
7
8
10
12
6
7
8
10
12
A
B
C

RECTIFIER IN PP-7701/U

b. Fuses. Check all rectifier fuses for correct rating and type. See diagram inside rectifier for fuse locations.

Power Supply Model	Fuse Desig	Rating (amps)
PP-7694/U	F1	70
	F2	1
PP-7695/U	F1	150
	F2	5
	F3	30
PP-7696/U	F1	250
	F2	5
	F5	60
PP-7697/U	F1	150
	F2	1
PP-7698/U	F1	150
	F2	5
	F3	30
PP-7699/U	F1	250
	F1A	.25
	F2	3
	F3	60
	F3A	.25

Power Supply Model	Fuse Desig	Rating (amps)
PP-7700/U	F1	600
	F2	5
	F3	2
	F4	2
	F8	60
	F9	60
PP-7701/U	F1	600
	F1A	.25
	F2	3
	F3	60
	F3A	.25
	F4	60
	F4A	.25
	F5	5
	F6	5

5-7. WIRING A POWER SUPPLY.

CAUTION

All connections must be made before applying power. For additional safety information refer to warning pages in front of manual.

a. Control Wires.

(1) Remote Voltage Sensing.

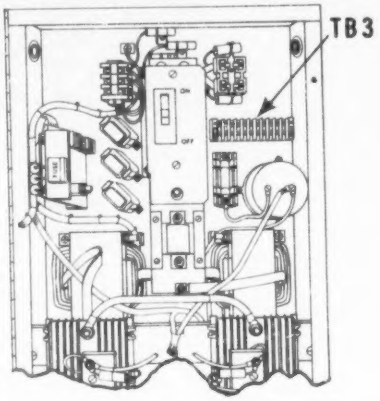
CAUTION

Polarity of remote voltage sensing leads is critical. Verify connections carefully to be sure that polarity is correct.

NOTE

Use 16 GA minimum wire for alarm wires.

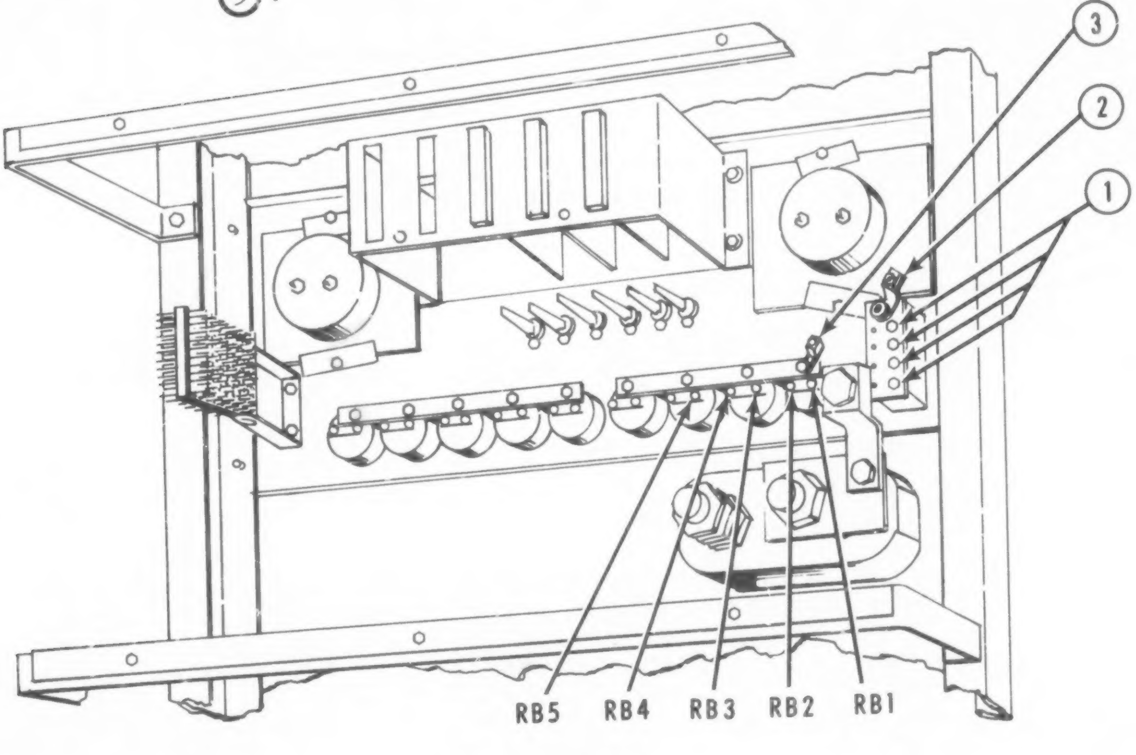
(a) To put rectifiers on remote voltage sensing, remove jumpers at terminals 1 and 2 on left side or at top) of terminal board TB3 in each rectifier.



(b) Connect terminal 1 of TB3 (positive) on each rectifier to reference ground bus ① on power board.

(c) Connect terminal 2 of TB3 (negative) on each rectifier to power board reference battery fuses (RB1, RB2, etc).

(d) Connect positive terminal of site battery to power board reference ground bus ②, and negative terminal of site battery to power board battery reference bus ③.

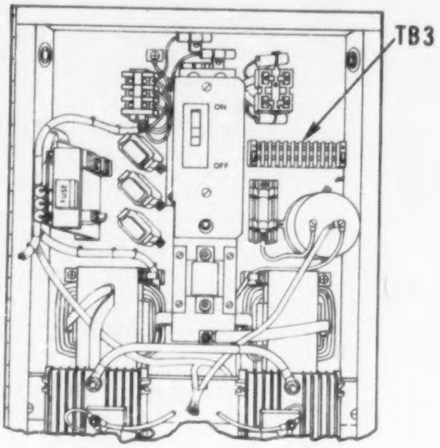


POWER BOARD

(2) Load Sharing. To operate rectifiers in a load sharing mode, wire all rectifiers together at terminal 3 of terminal board TB3.

(3) Remote Equalize. To put rectifiers in equalize mode, an external switch is required. Change jumper between terminals listed below:

(a) On power supplies PP-7694/U, PP-7697/U, PP-7699/U, and PP-7701/U, remove jumper between terminals 4 and 5 of rectifier terminal board TB3 and extend them to remote switch.



(b) For power supplies PP-7695/U, PP-7696/U, PP-7698/U, and PP-7700/U, remove jumper between terminals 10 and 11 of rectifier terminal board TB3 and extend them to remote switch.

NOTE

Power board FLOAT/EQUALIZE switch must be in FLOAT for remote equalize to operate.

When remote switch contacts are open, power supply will be in equalize.

b. Rectifier Alarm Wires.

(1) For all power supplies, connect wires from terminals 4 and 5 of each rectifier terminal board TB3 to terminals A1 and F1 on power board terminal board TBA.

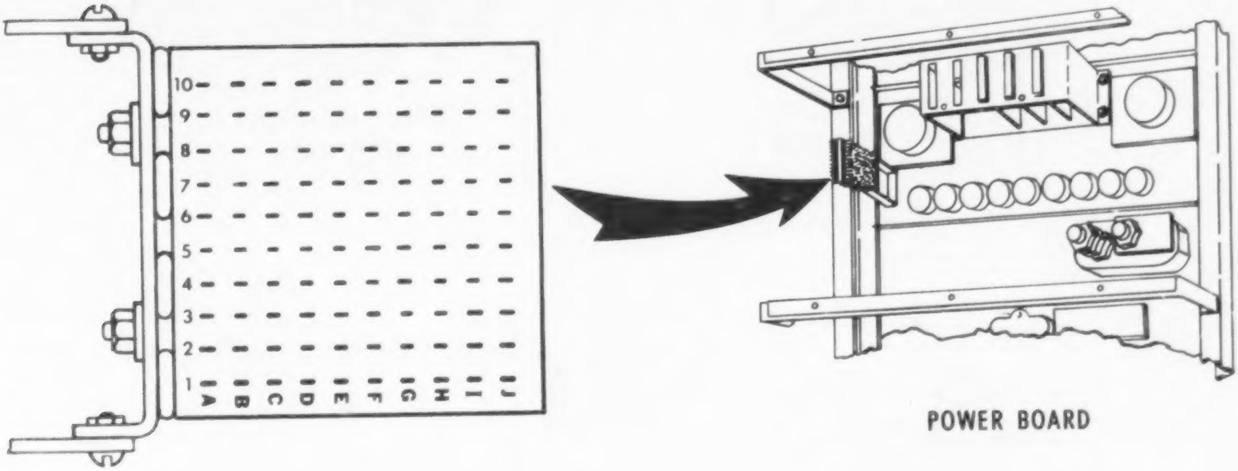
(2) For power supplies PP-7694/U, PP-7697/U, PP-7699/U, and PP-7701/U, use the following information to connect site external alarm wires:

(a) Rectifier off, low output voltage, high output voltage, or loss of input power is indicated by closed circuits between terminals 7 to 8 and 10 to 11, and open circuits between terminals 8 to 9 and 11 to 12 of TB3.

(b) Rectifier off or low current is indicated by a closed circuit between terminals 13 to 14 and an open circuit between terminals 14 to 15 of terminal board TB3.

(3) For PP-7695/U, PP-7696/U, PP-7698/U, and PP-7700/U, use the following information to connect site external alarm wires.

Rectifier off, low current, low output voltage, high output voltage, or loss of input power is indicated by closed circuits between terminals 4 to 5 and 7 to 8, and open circuits between terminals 5 to 6 and 8 to 9 of TB3.



POWER BOARD

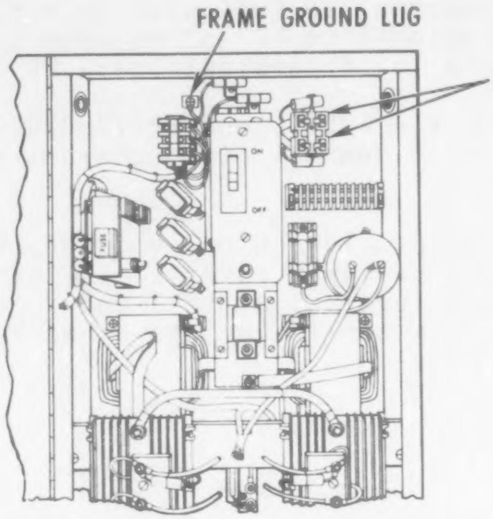
c. Power Board Alarm Wires.

Use the following information to connect site external alarm wires to power board.

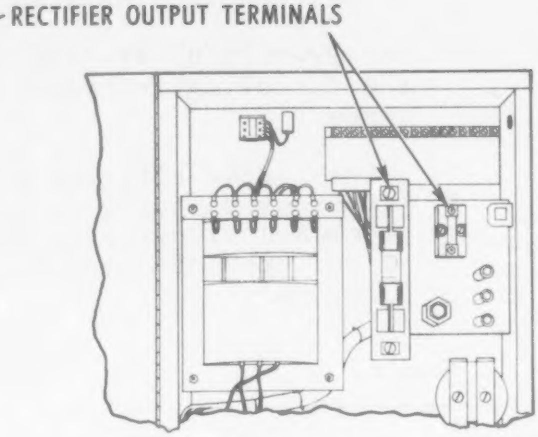
Rectifier failure alarm to J1 and I3 of power board terminal TBA. High/low voltage alarm to J4 and I5 of power board TBA. Fuse alarm wires to J9 and I8 of power board terminal TBA.

d. Load Wires.

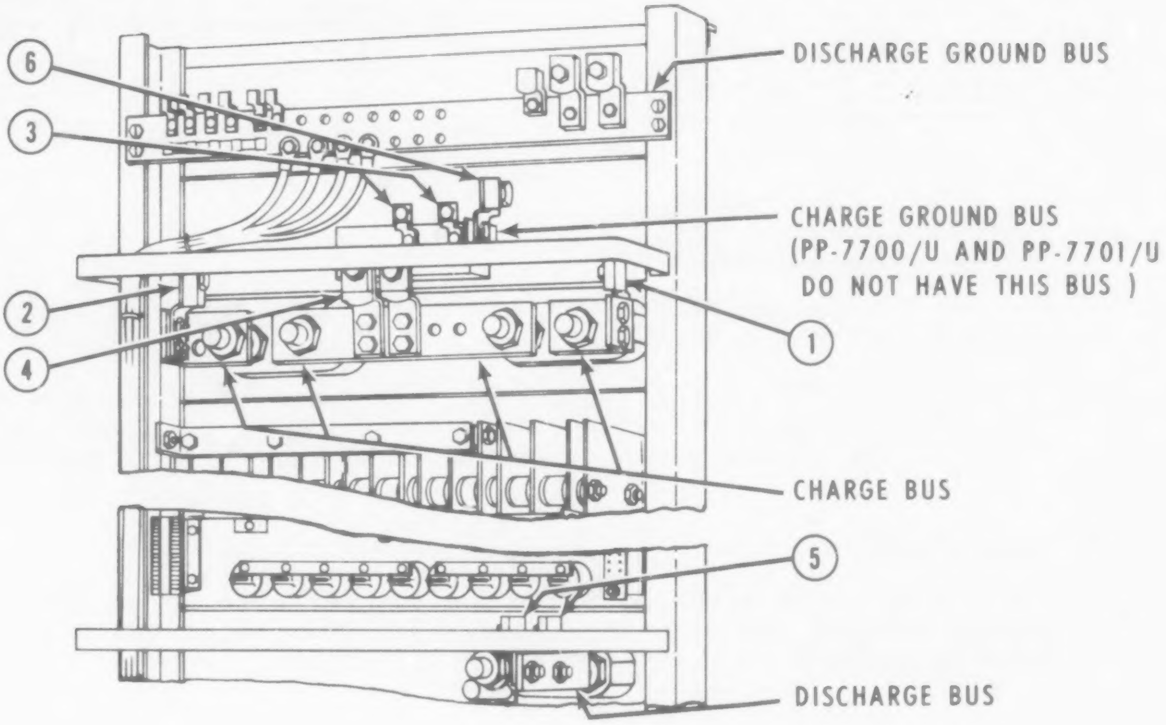
Connect all load wires to power board. See site power distribution drawing for wire locations. The power distribution drawing is kept on file at power supply site.


FRAME GROUND LUG
RECTIFIER OUTPUT TERMINALS
ON
OFF
FUSE

PP-7695/U, PP-7696/U, AND
PP-7698/U THRU PP-7701/U
RECTIFIER


RECTIFIER OUTPUT TERMINALS

PP-7694/U AND PP7697/U
RECTIFIER


⑥
③
②
④
①
⑤
DISCHARGE GROUND BUS
CHARGE GROUND BUS
(PP-7700/U AND PP-7701/U
DO NOT HAVE THIS BUS)
CHARGE BUS
DISCHARGE BUS

POWER BOARD

e. DC Ouptut Wires.

(1) Connect a DC output lead from negative output terminal (NEG) on one rectifier to power board CHG 1 fuse ①.

(2) Connect a DC output lead from negative output terminal (NEG) on second rectifier to power board CHG 2 fuse ②.

(3) (Air Force only) Additional rectifiers are connected to CHG 3 and CHG 4 fuses.

(4) On Army power supplies PP-7694/U through PP-7699/U only, connect a DC output lead from positive output terminal (POS) on each rectifier to power board charge ground bus ③.

(5) On Army power supplies PP-7700/U and PP-7701/U, and all Air Force power supplies, connect a DC output lead from positive output (POS) on each rectifier to power board discharge ground bus.

f. Ground Wires.

(1) Connect a green wire from protective ground in site AC distribution box to frame ground lug (GND) located inside each rectifier in upper left corner.

(2) Connect a green wire from site station ground to the top mounting flange of power board and rectifier frames. Drill holes if necessary and scrape away any paint to make a good electrical contact.

(3) Connect a yellow DC ground from site ground to one of the terminals on power board discharge ground bus.

g. Battery Wires (Army Only).

(1) Connect a battery wire from negative terminal of site battery to ④ on power board charge bus.

(2) Connect a second battery wire from negative terminal of site battery to ⑤ on power board discharge bus.

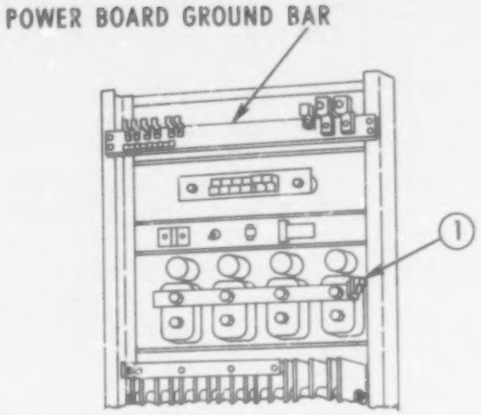
(3) Connect a battery wire from positive terminal of site battery to power board discharge ground bus.

(4) On power supplies PP-7694/U through PP-7699/U only, connect a battery wire from positive terminal of site battery to ⑥ on power board charge ground bus.

h. Battery Wires (Air Force Only).

(1) Connect a battery wire from negative terminal of site battery to bus ① on power board termination panel.

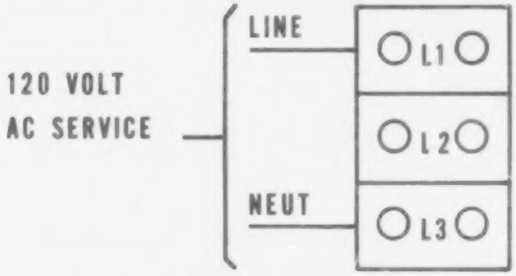
(2) Connect a battery wire from positive teminal of site battery to power board ground bar assembly.


POWER BOARD GROUND BAR
①

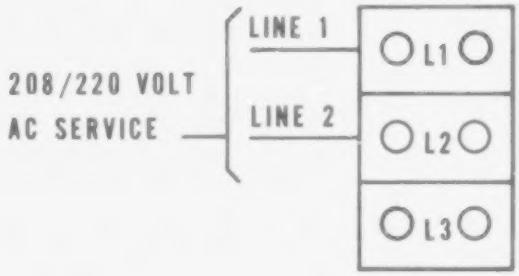
TOP OF POWER BOARD
(AIR FORCE ONLY)

i. AC Input Wires.

(1) On power supplies PP-7694/U and PP-7697/U, connect AC input power leads to terminal block TB1 as shown below.


120 VOLT
AC SERVICE
LINE
NEUT
L1
L2
L3

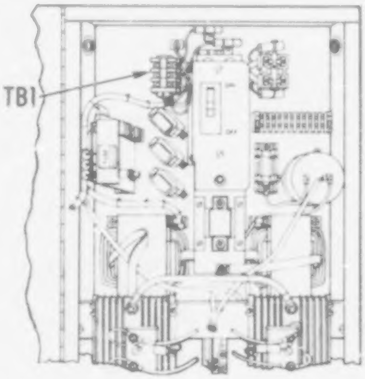
TB1 AC INPUT


208/220 VOLT
AC SERVICE
LINE 1
LINE 2
L1
L2
L3

TB1 AC INPUT

(2) On all other power supplies listed in this manual, connect the three AC input leads to terminal block TB1 as follows:

Phase A (black wire) to L1.
Phase B (red wire) to L2.
Phase C (blue wire) to L3.



5-8. STARTUP AND CHECKOUT.

WARNING

Voltage in rectifier may be in excess of 56 volts to ground. Observe usual precautions and avoid contact with terminals. For additional safety information refer to warning pages at front of manual.

NOTE

The rectifiers must be individually checked. Complete each procedure below for each rectifier in the power supply.

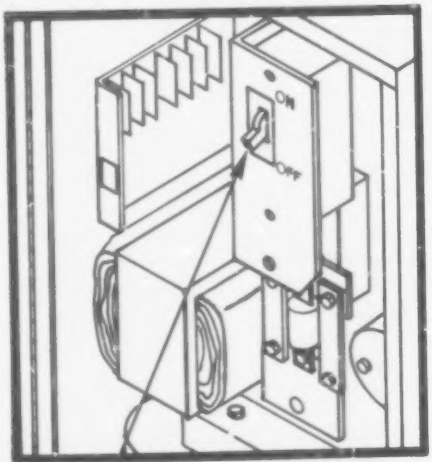
For location of switches and meters called out in the following procedures, see drawings in paragraph 2-2 through 2-4.

a. Rectifier Startup.

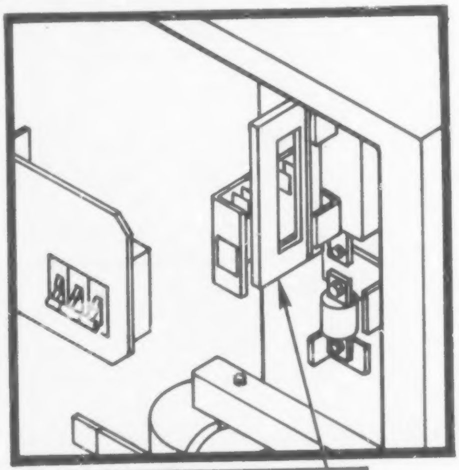
NOTE

In power supplies PP-7700/U and PP-7701/U, the battery disconnect covered in the following step is not a switch. It is a removable link.

(1) Open rectifier doors, and make sure that battery disconnect switch is on, or battery disconnect link is installed in each rectifier. Close and secure rectifier doors.



PP-7694/U THRU PP-7699/U
BATTERY DISCONNECT SWITCH



PP-7700/U AND PP-7701/U
BATTERY DISCONNECT LINK

(2) Gently zero adjust meters on rectifiers and power board. Use the adjusting screw located below each meter.

(3) (Air Force only) Turn power board battery switch to ON.

(4) Turn on site AC input circuit breaker.

(5) Slowly turn on AC INPUT switch on one rectifier. Rectifier should start, and OUTPUT VOLTAGE meter should read between 48 VDC and 54 VDC. Alarms may be on.

(6) Repeat procedure for each remaining rectifier.

(7) Turn off all rectifiers.

b. Rectifier Current Limit Adjustment.

CAUTION

The rectifier is not rated for continuous duty above 100% of rated current. Loads of up to 125% may be tolerated for short periods when recharging a discharged battery, but prolonged operation at over 100% load may cause permanent damage.

NOTE

The rectifier is factory set to limit its output current at 100% of rated output.

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Turn on one rectifier, and load it to greater than its output current rating shown below.

Output Current Ratings

PP-7694/U	50 amps	PP-7698/U	100 amps
PP-7695/U	100 amps	PP-7699/U	200 amps
PP-7696/U	200 amps	PP-7700/U	400 amps
PP-7697/U	100 amps	PP-7701/U	400 amps

(2) While watching OUTPUT CURRENT meter on rectifier, turn on rectifier AC INPUT switch. OUTPUT CURRENT meter should gradually increase to 50% of full load in 5 seconds, 75% of load in 7.5 seconds, and 90% of load in 9 seconds.

(3) To change current limit value, adjust CURRENT LIMIT ADJUST potentiometer, accessable through a hole in front panel of rectifier. Turning potentiometer clockwise will increase the current limit setting. Adjust potentiometer until OUTPUT CURRENT meter on front panel indicates the correct output rating for the rectifier ±5%.

(4) Turn off rectifier.

(5) Repeat procedure for each remaining rectifier.

c. Rectifier Operating Range Adjustment.

NOTE

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Push rectifier FLOAT/EQUALIZE switch to FLOAT.

CAUTION

Potentiometers can be easily broken if turned too hard. Use a plastic screwdriver with a 1/8 inch blade.

(2) Adjust FLOAT ADJUST potentiometer, accessible through a hole in front panel of rectifier, to center of its range.

(3) Turn EQUALIZE ADJUST potentiometer fully counterclockwise.

(4) Set test load to 10% of retifier output current rating as shown below.

Output Current Ratings

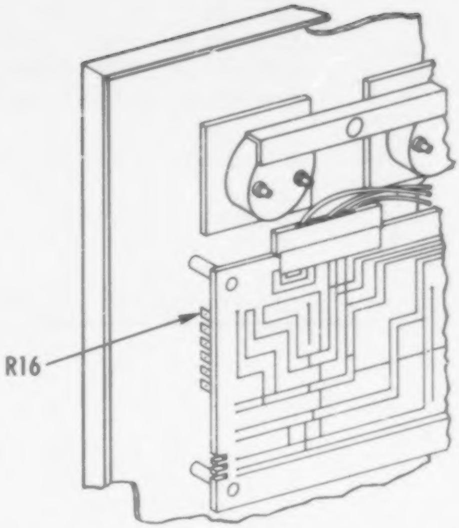
PP-7694/U	50 amps	PP-7698/U	100 amps
PP-7695/U	100 amps	PP-7699/U	200 amps
PP-7696/U	200 amps	PP-7700/U	400 amps
PP-7697/U	100 amps	PP-7701/U	400 amps

(5) Turn on rectifier, open door, and adjust potentiometer R16 to obtain a rectifier OUTPUT VOLTAGE meter reading of 52±.5 VDC.

(6) Observe rectifier OUTPUT VOLTAGE meter. Turn FLOAT ADJUST potentiometer until OUTPUT VOLTAGE meter reading goes below 48.3 VDC and above 55.2 VDC.

(7) If OUTPUT VOLTAGE meter will not meet the readings shown above, readjust potentiometer R16 slightly and repeat the above step.

(8) Adjust FLOAT ADJUST potentiometer until OUTPUT VOLTAGE meter again reads 52 ±.5 VDC.



RECTIFIER DOOR

(9) Push FLOAT/EQUALIZE switch to EQUALIZE.

(10) Adjust EQUALIZE ADJUST potentiometer, accessible through a hole in front panel of rectifier, until OUTPUT VOLTAGE meter exceeds 58.8 VDC.

NOTE

If circuit breaker trips before 58.8 VDC is reached, adjust overvoltage shutdown setting (step e). Then repeat step (10).

(11) Push FLOAT/EQUALIZE switch back to FLOAT.

(12) Turn off rectifier.

(13) Repeat procedure for each remaining rectifier.

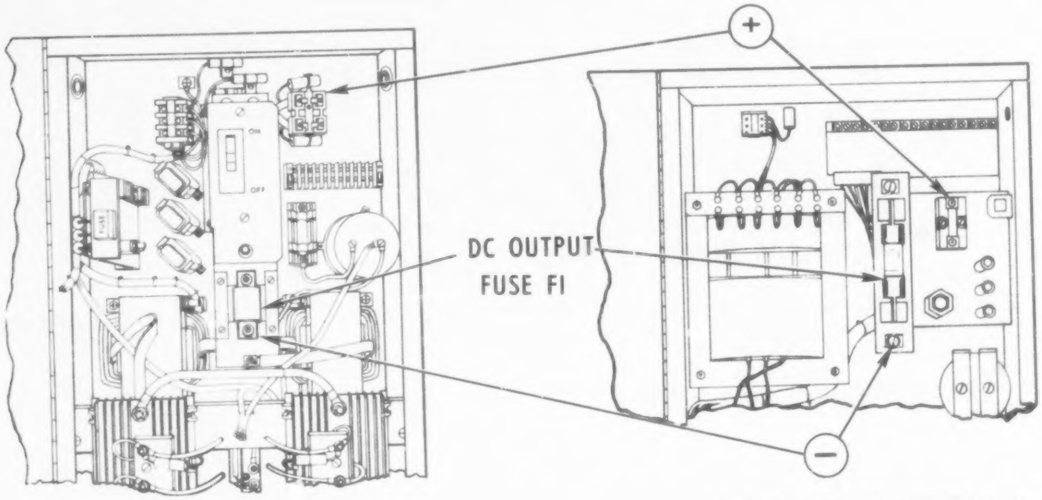
d. Rectifier High and Low Voltage Alarm Adjustment.

NOTE

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Turn off all rectifiers.

(2) Remove DC output fuse F1 from one rectifier.



PP-7695/U, PP-7696/U, AND PP-7698/U THRU PP-7701/U

PP-7694/U OR PP-7697/U

(3) Connect adjustable DC Power Supply 6294A (Appendix C) to POS output terminal (+), and rectifier side (lower end) of fuseholder F1 (-). Be sure that polarity is correct.

WARNING

After connecting power supply, hazardous DC voltage is present at DC output terminals and DC output fuse holder.

(4) Turn potentiometer R38 fully counterclockwise, and potentiometer R39 fully clockwise.

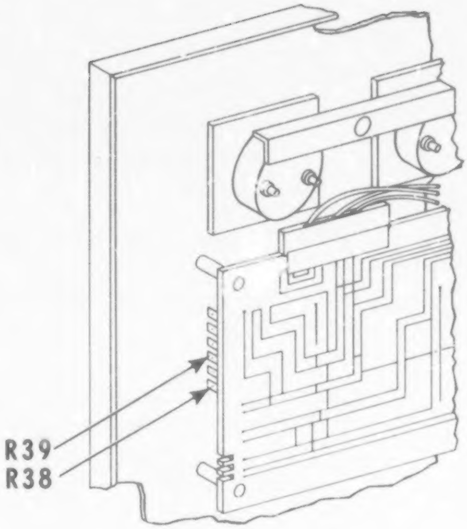
(5) Turn on AC INPUT switch.

(6) Use digital multimeter 8600A to adjust external DC supply to an output of 47.0 volts.

(7) Slowly adjust potentiometer R38 clockwise until LOW VOLTAGE ALARM light on front panel comes on. This sets the low voltage alarm.

(8) Adjust external DC supply to an output of 57.5 volts.

(9) Slowly adjust potentiometer R39 counterclockwise until HIGH VOLTAGE ALARM light on front panel comes on. This sets the high voltage alarm.



RECTIFIER DOOR

(10) Turn off AC INPUT switch, remove external DC supply, and replace fuse F1.

(11) Repeat procedure for each remaining rectifier.

e. Rectifier Overvoltage Shutdown Adjustment.

NOTE

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Turn off AC INPUT switch on all rectifiers.

(2) Disconnect site battery from rectifiers.

(3) If rectifier remote voltage sensing leads are extended, reconnect them to rectifier output terminals.

(4) Connect a digital multimeter 8600A to rectifier output terminals.

(5) Connect test load (Appendix C) to power board. Turn on rectifier and adjust test load to give a sufficient load to extinguish LOW CURRENT ALARM light.

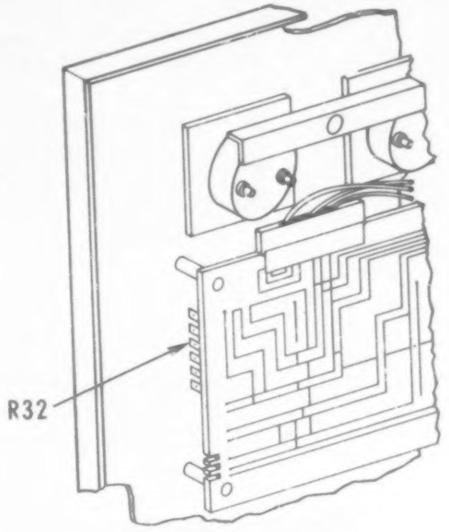
(6) Turn potentiometer R32 fully clockwise.

(7) Push rectifier FLOAT/EQUALIZE switch to EQUALIZE.

(8) Note volts reading on digital multimeter.

(9) Use EQUALIZE ADJUST potentiometer on front of rectifier to adjust output voltage to desired rectifier shutdown value (59.0 -.5 volts).

(10) Slowly turn potentiometer R32 counterclockwise until rectifier shuts off. This sets the overvoltage shutdown point.



RECTIFIER DOOR

(11) Turn EQUALIZE ADJUST potentiometer counterclockwise 1/2 turn, and turn rectifier back on.

(12) Readjust EQUALIZE ADJUST potentiometer until digital multimeter shows the same volts reading as noted above.

(13) Turn off rectifier and remove multimeter.

(14) Repeat procedure for each remaining rectifier.

(15) Remove test load, reconnect site battery, and extend remote voltage sensing leads, if desired.

f. Rectifier Battery Float Voltage Adjustment.

NOTE

Rectifier has been factory adjusted to provide 52.08 VDC during float operation. This is based on a float charge of 2.17 volts per cell.

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Turn on all rectifiers.

(2) Push FLOAT/EQUALIZE switch to FLOAT.

(3) The OUTPUT VOLTAGE meter should read 53.5±.5 VDC for a lead-calcium battery, or 52.08±.5 VDC for a lead-antimony battery.

(4) If adjustment is needed, adjust FLOAT ADJUST potentiometer, accessible through a hole in front panel of rectifier, until OUTPUT VOLTAGE meter reading is correct. To increase float voltage, slowly turn potentiometer clockwise.

NOTE

Allow battery voltage to stabilize at its new value before checking the OUTPUT VOLTAGE meter reading.

(5) Repeat the above adjustment as necessary to obtain the required float voltage.

NOTE

When float voltage is adjusted, equalize voltage will be affected. Check equalize voltage (step g), and adjust if necessary.

(6) Repeat procedure for each remaining rectifier.

g. Rectifier Equalize Voltage Adjustment.

NOTE

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Turn on all rectifiers.

(2) Push all rectifier FLOAT/EQUALIZE switchs to EQUALIZE.

NOTE

Rectifier has been factory adjusted to provide 56 VDC during equalize charge operation. This is based on an equalize charge of 2.33 volts per cell for a 24-cell battery.

(3) OUTPUT VOLTAGE meter should read 56.5±.5 VDC for either a lead-calcium, or a lead-antimony battery.

(4) If adjustment is needed, adjust EQUALIZE ADJUST potentiometer, accessible through a hole in front panel of rectifier, until OUTPUT VOLTAGE meter reading is correct. To increase float voltage, slowly turn potentiometer clockwise.

NOTE

Allow rectifier voltage to stabilize at its new value before checking OUTPUT VOLTAGE meter reading.

(5) Repeat the above adjustment as necessary to obtain the required equalize voltage.

(6) Push FLOAT/EQUALIZE switch on adjusted reftifier back to FLOAT.

(7) Repeat procedure for each remaining rectifier.

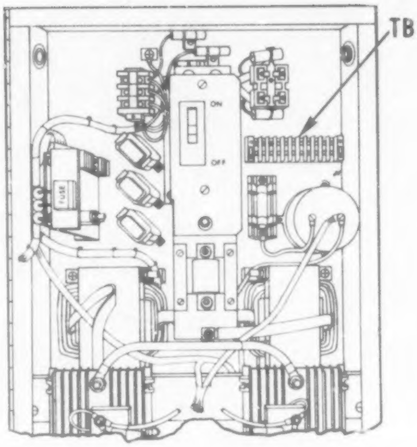
h. Rectifier Load Sharing Adjustment.

WARNING

110 VAC and 48 VDC are present inside the rectifier. For additional safety information refer to warning pages at front of manual.

NOTE

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.



(1) Turn off all rectifiers.

(2) Disconnect load sharing leads from terminal 3 of terminal board TB3 in each rectifier.

(3) Connect test load (appendix C) to power board.

(4) Turn on and load power supply to at least 1/4 of its rated load.

WARNING

Hazardous voltage is present inside the rectifier.

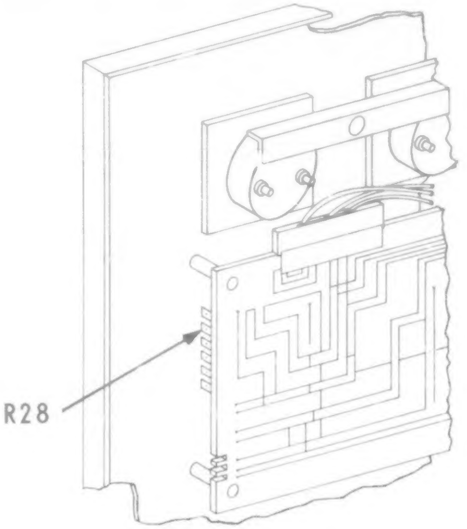
(5) Connect a digital multimeter 8600A across terminals 2 (-) and 3 (+) of terminal board TB3 in one rectifier.

(6) Adjust potentiometer R28 on rectifier to obtain a voltmeter reading of 2 volts DC.

(7) Turn off rectifiers. Reconnect rectifier load sharing leads to terminal 3 of TB3 in each rectifier.

(8) Turn on all rectifiers, and adjust FLOAT ADJUST on each rectifier until all rectifiers equally share the load (All rectifier OUTPUT CURRENT meters will read the same). This will adjust all rectifiers to the same voltage.

(9) Turn off all rectifiers, and remove test load.



RECTIFIER DOOR

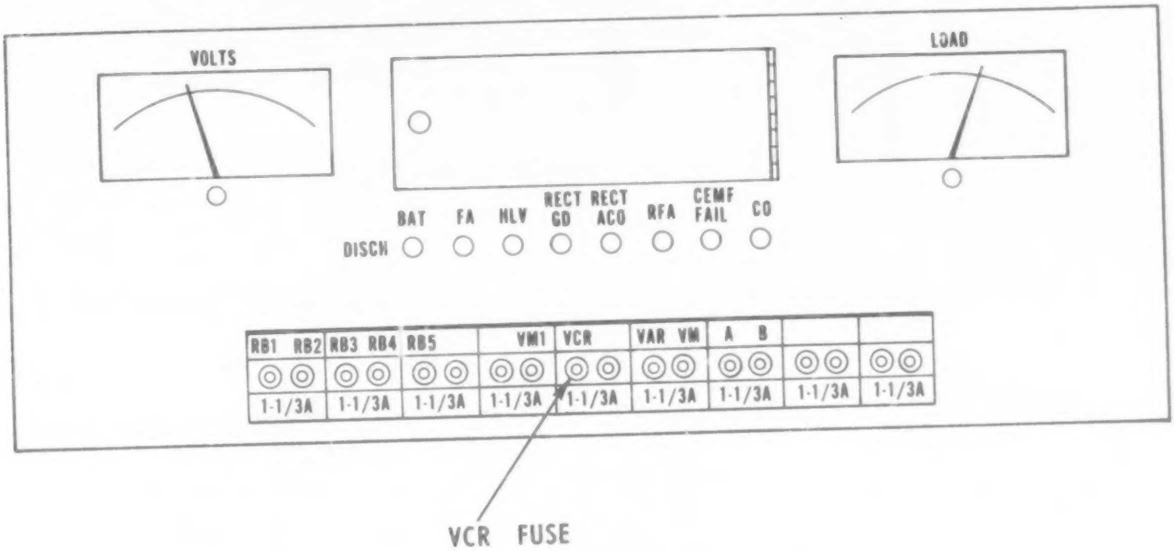
i. Power Board High and Low Voltage Control Relay Adjustment.

NOTE

For location of switches and meters called out in the following procedures, see drawings in paragraphs 2-2 through 2-4.

(1) Turn off all rectifiers.

(2) Remove VCR fuse from front of power board.

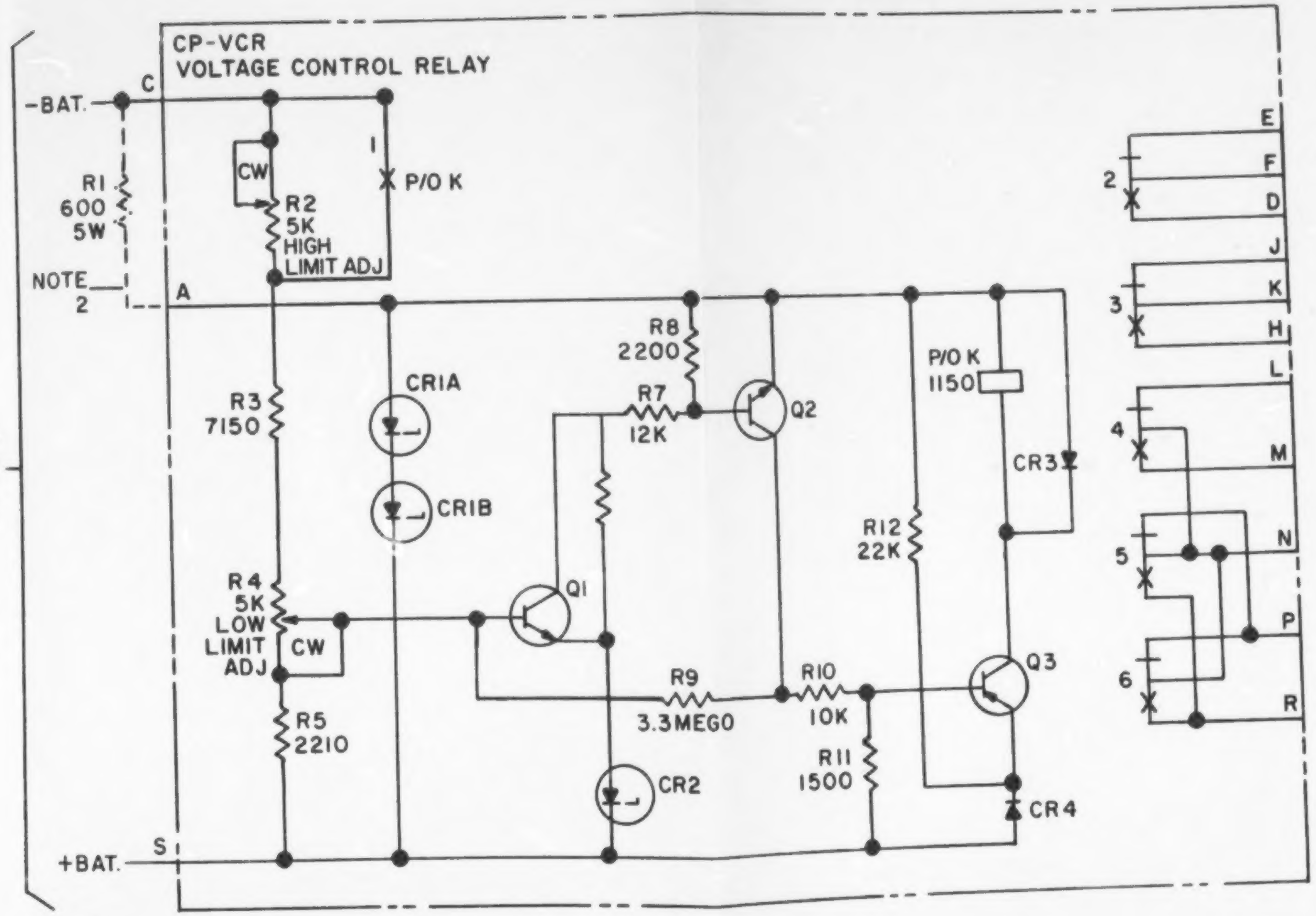

VOLTS
LOAD
BAT
FA
HLV
RECT GD
RECT ACO
RFA
CEMF FAIL
CO
DISCH
RB1
RB2
RB3
RB4
RB5
VM1
VCR
VAR VM
A
B
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
1-1/3A
VCR FUSE

NOTE

The voltage control relay is factory set to release at 47.5 VDC, and operate at 51.5 VDC.

CAUTION

When performing step (3), polarity of both DC supply voltage and test voltage connections to voltage sensing circuit is critical. Incorrect polarity will damage the voltage sensing assembly.


CP-VCR
VOLTAGE CONTROL RELAY
-BAT.
C
R1
600
5W
NOTE
2
A
NOTE 3
+BAT.
S
CW
R2
5K
HIGH
LIMIT ADJ
1
P/O K
R3
7150
CR1A
CR1B
R4
5K
LOW
LIMIT
ADJ
CW
R5
2210
R8
2200
R7
12K
Q2
Q1
R9
3.3MEGO
CR2
R10
10K
R11
1500
P/O K
1150
CR3
R12
22K
Q3
CR4
E
F
D
J
K
H
L
M
N
P
R
2
3
4
5
6

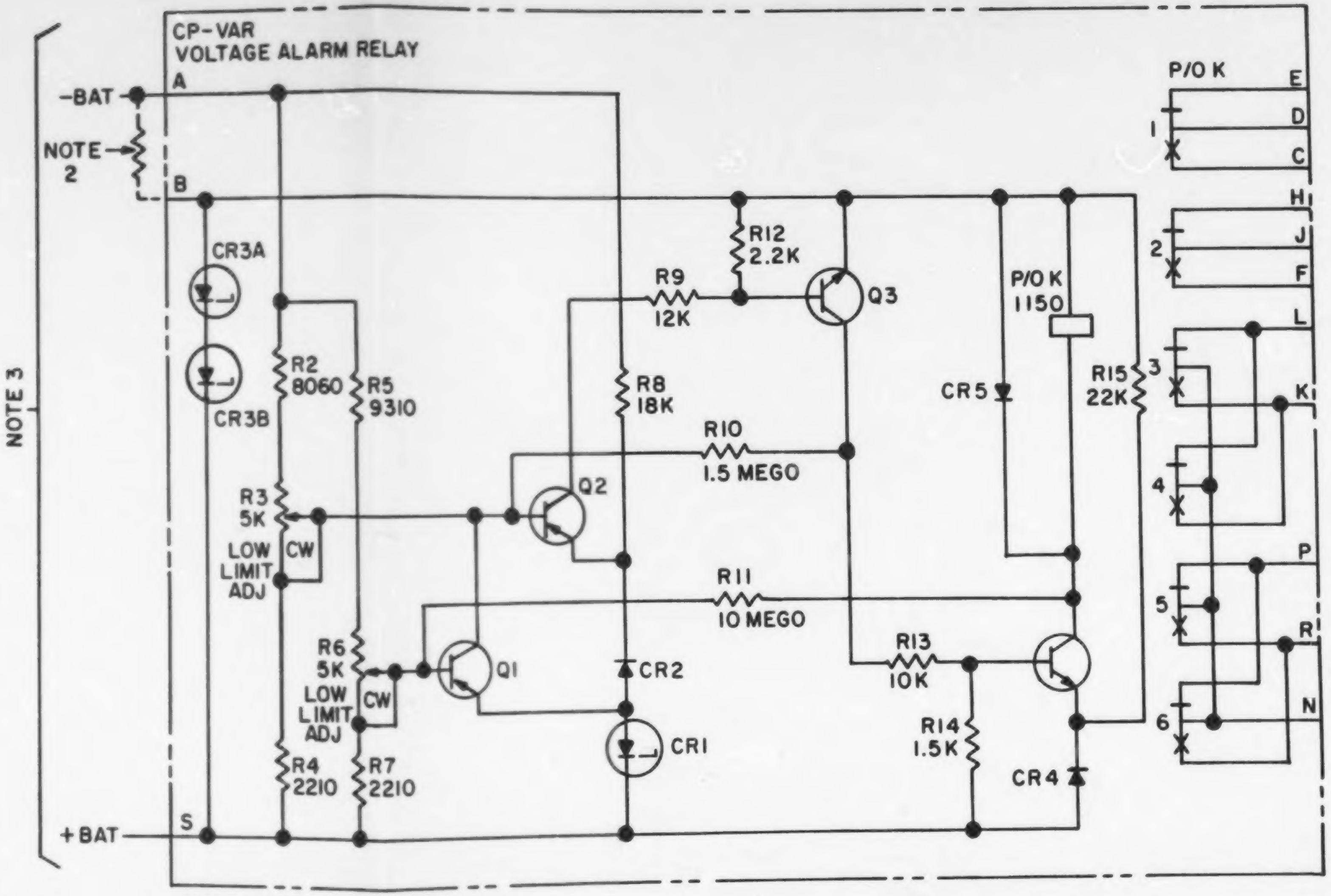
NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS AND CAPACITANCE VALUES ARE IN MICROFARADS.
2. ITEMS SHOWN WITH DOTTED LINES ARE NOT SUPPLIED AS PART OF THIS ASSEMBLY.
3. PROVIDE 1-1/3 AMP FUSE IN EITHER – BAT. LEAD FOR POSITIVE GROUND SYSTEMS OR + BAT. LEAD FOR NEGATIVE GRD SYSTEMS.
4. POLARIZING NOTCH ON B.

EL8VS006

FIGURE FO-4. POWER BOARD VOLTAGE CONTROL RELAY SCHEMATIC.

READEX FICHE


CP-VAR
VOLTAGE ALARM RELAY
-BAT
A
NOTE
2
B
NOTE 3
CR3A
CR3B
R2
8060
R5
9310
R3
5K
LOW
LIMIT
ADJ
CW
R6
5K
LOW
LIMIT
ADJ
CW
R4
2210
R7
2210
+BAT
S
Q1
Q2
Q3
R8
18K
R9
12K
R12
2.2K
R10
1.5 MEGO
R11
10 MEGO
CR2
CR1
R13
10K
R14
1.5K
CR4
CR5
P/O K
1150
R15
22K
P/O K
E
D
C
H
J
F
L
K
P
R
N
1
2
3
4
5
6

NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS AND CAPACITANCE VALUES ARE IN MICROFARADS.
2. RESISTOR R1, 600 OHM, 5 W (SHOWN WITH DOTTED LINE) IS NOT SUPPLIED AS PART OF THIS ASSEMBLY.
3. PROVIDE 1 1/3 AMP FUSE IN EITHER -BAT LEAD FOR POSITIVE GROUND SYSTEMS OR +BAT LEAD FOR NEG. GROUND SYSTEMS.
4. POLARIZE NOTCH ON M.

EL8VS007

FIGURE FO-5. POWER BOARD VOLTAGE ALARM RELAY SCHEMATIC.

FIG 1

DISTRIBUTION FUSES (0-5 AMP)

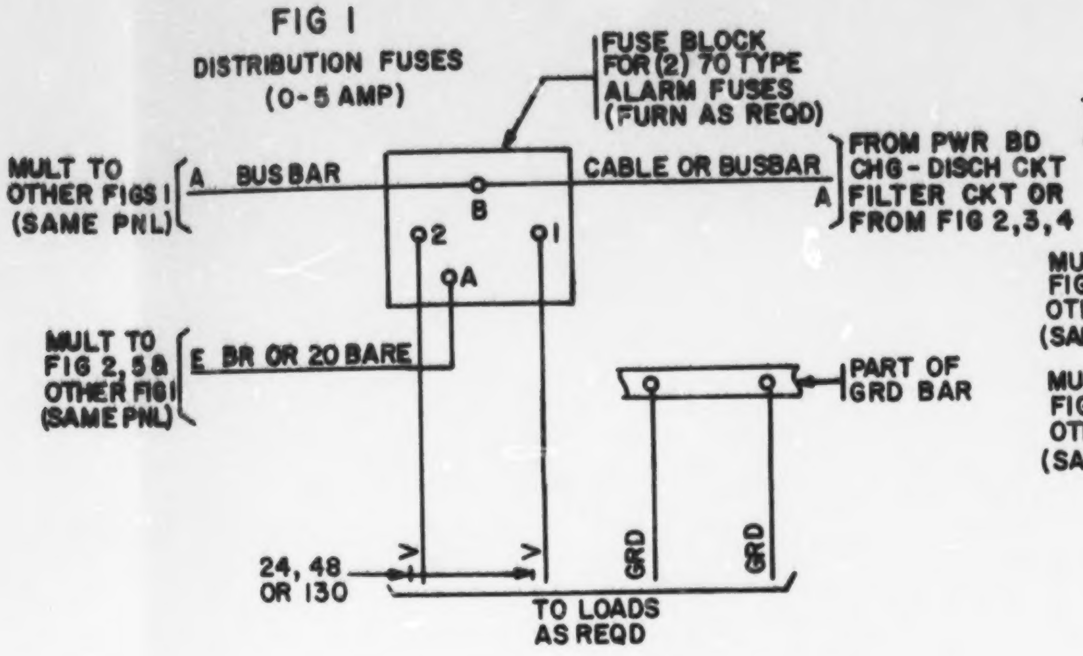

FUSE BLOCK FOR (2) 70 TYPE ALARM FUSES (FURN AS REQD)
MULT TO OTHER FIGS 1 (SAME PNL)
A
BUS BAR
B
2
1
A
CABLE OR BUSBAR
A
FROM PWR BD CHG-DISCH CKT FILTER CKT OR FROM FIG 2,3,4
MULT TO FIG 2,5 & OTHER FIG 1 (SAME PNL)
E
BR OR 20 BARE
PART OF GRD BAR
24, 48 OR 130
V
V
GRD
GRD
TO LOADS AS REQD

FIG 2

DISTRIBUTION FUSES (0-30, 31-60, 61-100 OR 101-200 AMP)

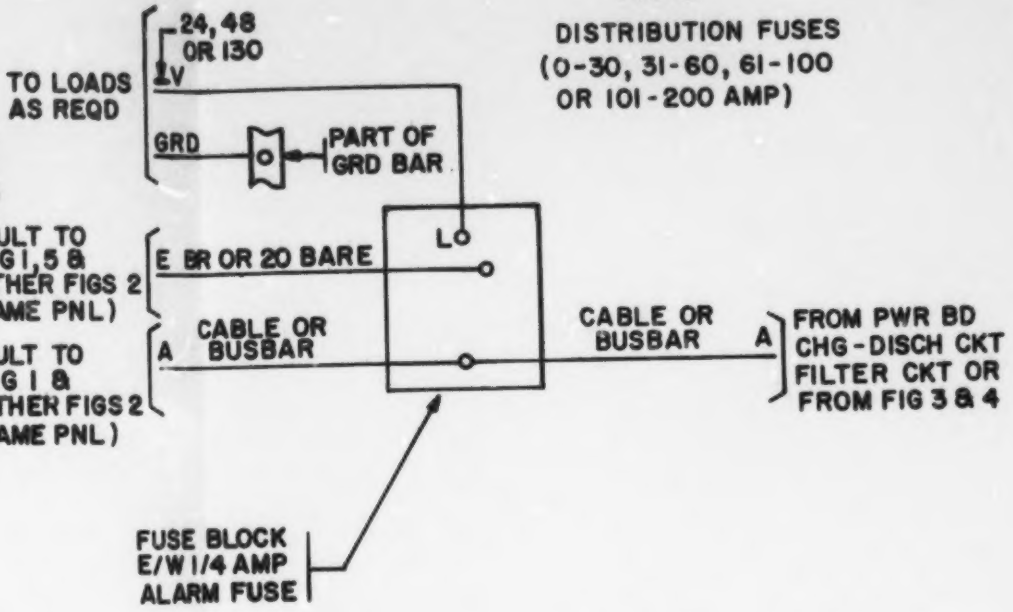

24, 48 OR 130
V
TO LOADS AS REQD
GRD
PART OF GRD BAR
L
MULT TO FIG 1, 5 & OTHER FIGS 2 (SAME PNL)
E
BR OR 20 BARE
MULT TO FIG 1 & OTHER FIGS 2 (SAME PNL)
A
CABLE OR BUSBAR
CABLE OR BUSBAR
A
FROM PWR BD CHG-DISCH CKT FILTER CKT OR FROM FIG 3 & 4
FUSE BLOCK E/W 1/4 AMP ALARM FUSE

FIG 5

FUSE ALARM RESISTOR

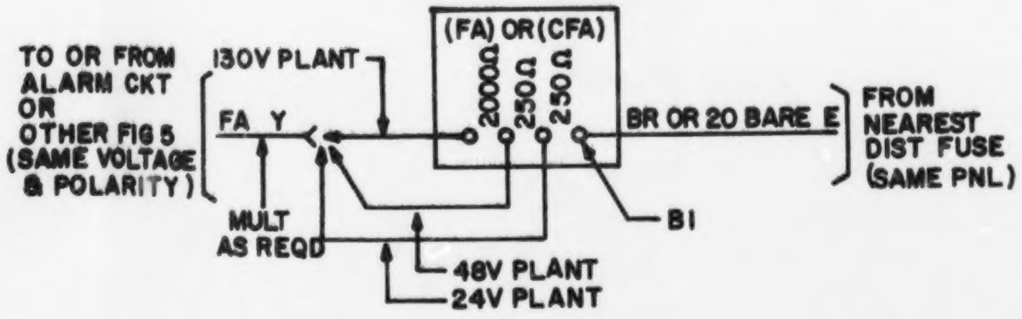

TO OR FROM ALARM CKT OR OTHER FIG 5 (SAME VOLTAGE & POLARITY)
FA
Y
130V PLANT
(FA) OR (CFA)
2000Ω
250Ω
250Ω
BR OR 20 BARE
E
FROM NEAREST DIST FUSE (SAME PNL)
MULT AS REQD
B1
48V PLANT
24V PLANT

FIG 6

ISOLATING ALARM RESISTOR

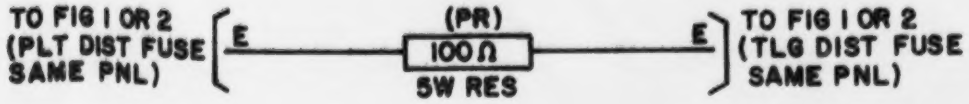

TO FIG 1 OR 2 (PLT DIST FUSE SAME PNL)
E
(PR)
100Ω
5W RES
E
TO FIG 1 OR 2 (TLG DIST FUSE SAME PNL)

FIG 7

DISTRIBUTION CKT BRKRS (0-60 AMP)

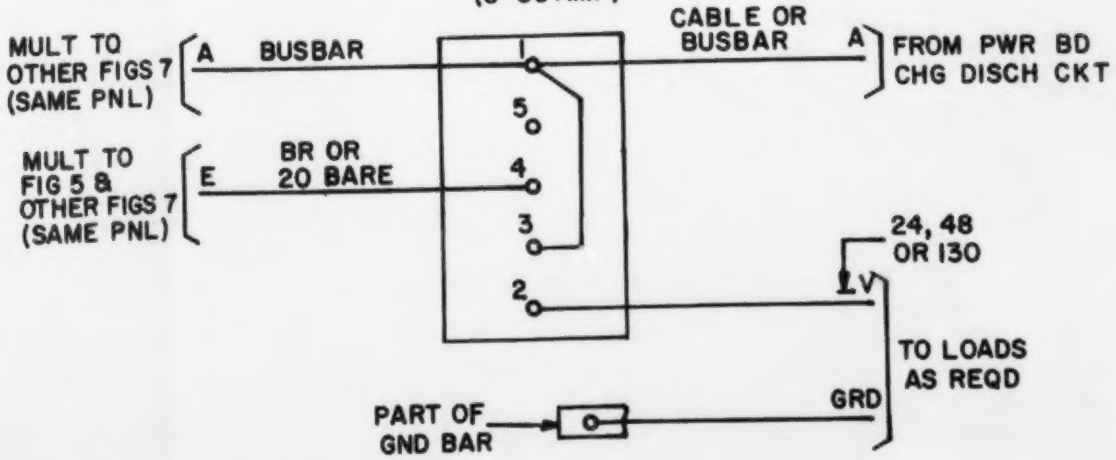

MULT TO OTHER FIGS 7 (SAME PNL)
A
BUSBAR
1
CABLE OR BUSBAR
A
FROM PWR BD CHG DISCH CKT
5
MULT TO FIG 5 & OTHER FIGS 7 (SAME PNL)
E
BR OR 20 BARE
4
3
2
24, 48 OR 130
V
TO LOADS AS REQD
GRD
PART OF GND BAR

FIG 3

DISTRIBUTION FUSES
(61-400 AMP)

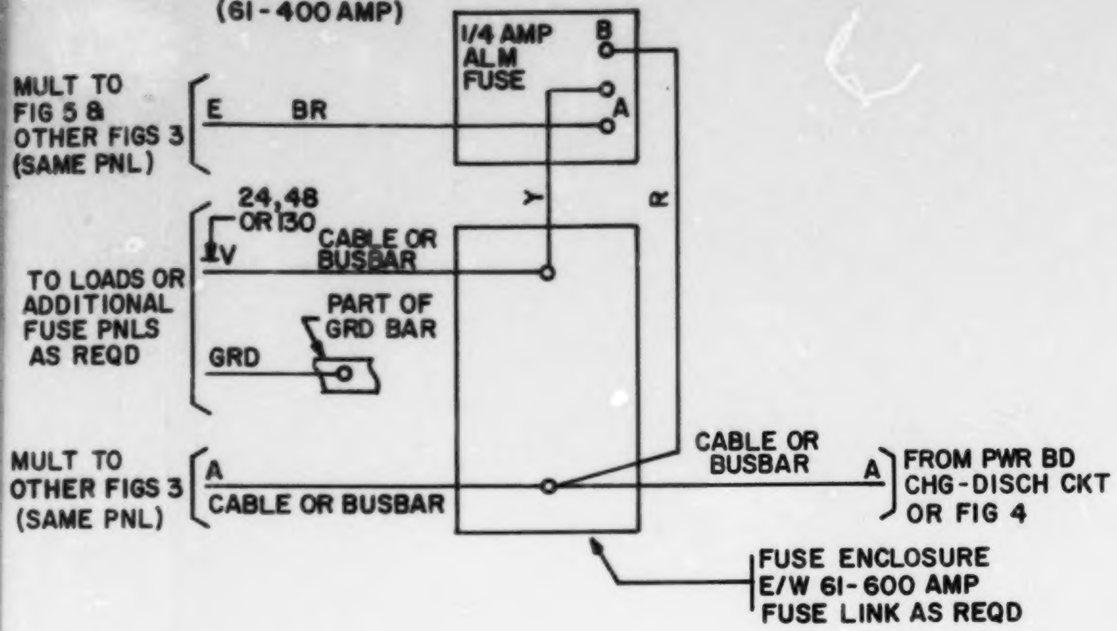

1/4 AMP ALM FUSE
B
A
MULT TO FIG 5 & OTHER FIGS 3 (SAME PNL)
E
BR
Y
R
24,48 OR 130
V
CABLE OR BUSBAR
TO LOADS OR ADDITIONAL FUSE PNLS AS REQD
PART OF GRD BAR
GRD
MULT TO OTHER FIGS 3 (SAME PNL)
A
CABLE OR BUSBAR
CABLE OR BUSBAR
A
FROM PWR BD CHG-DISCH CKT OR FIG 4
FUSE ENCLOSURE E/W 61-600 AMP FUSE LINK AS REQD

FIG 4

DISTRIBUTION
FUSE & SW UNIT
(100-600 AMP)

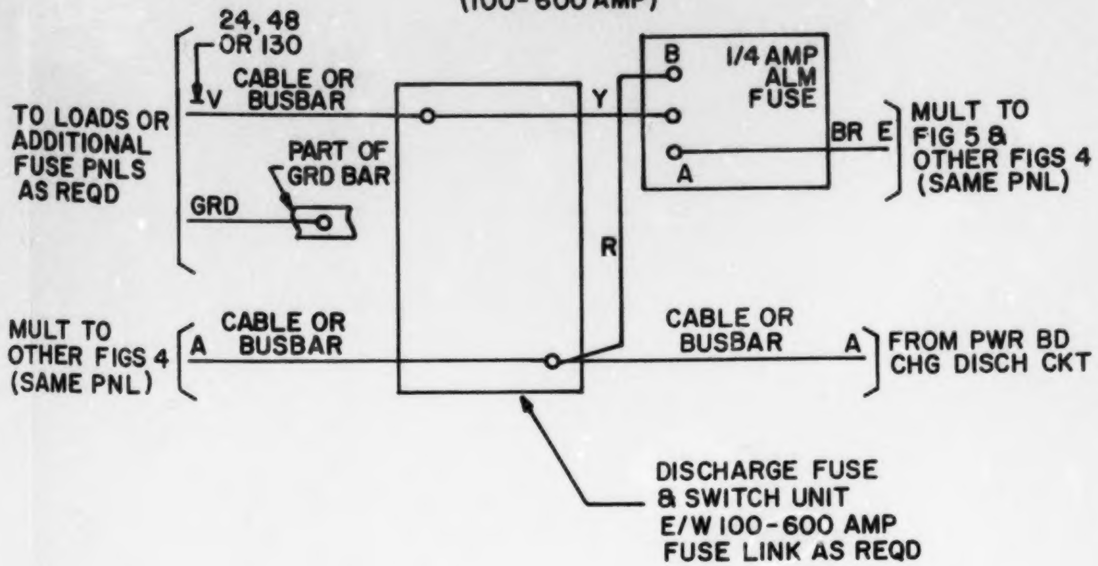

24,48 OR 130
V
CABLE OR BUSBAR
TO LOADS OR ADDITIONAL FUSE PNLS AS REQD
PART OF GRD BAR
GRD
Y
B
1/4 AMP ALM FUSE
A
BR E
MULT TO FIG 5 & OTHER FIGS 4 (SAME PNL)
R
MULT TO OTHER FIGS 4 (SAME PNL)
A
CABLE OR BUSBAR
CABLE OR BUSBAR
A
FROM PWR BD CHG DISCH CKT
DISCHARGE FUSE & SWITCH UNIT E/W 100-600 AMP FUSE LINK AS REQD

FIG 8

DISTRIBUTION
CKT BRKRS
(0-60 AMP)

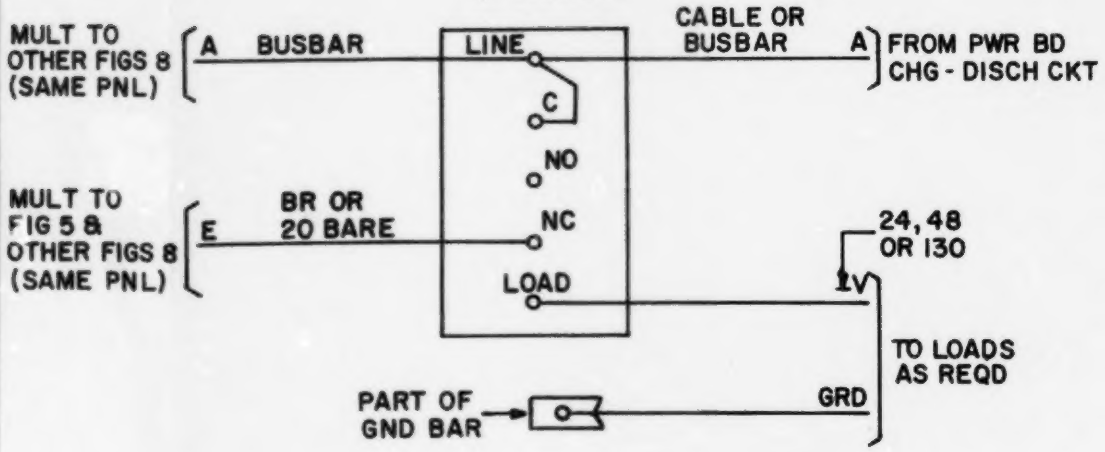
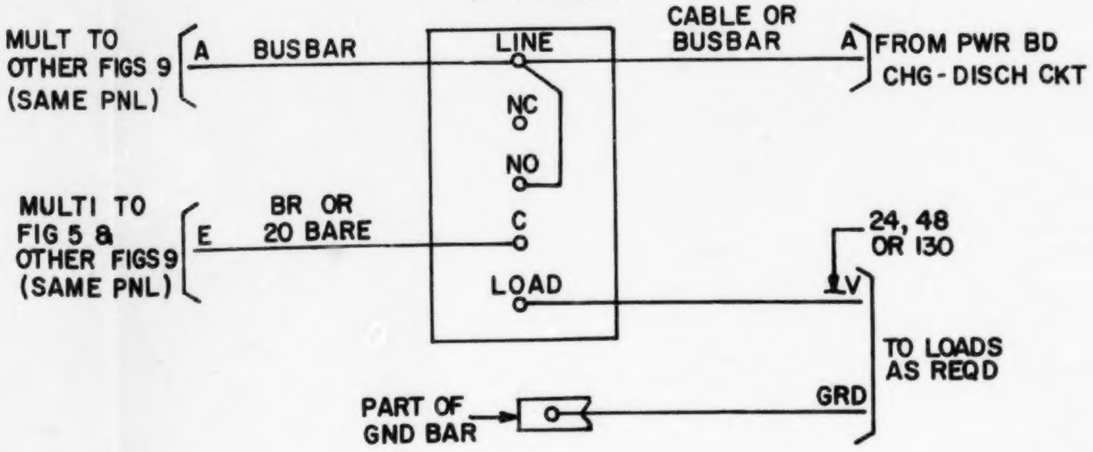

MULT TO OTHER FIGS 8 (SAME PNL)
A
BUSBAR
LINE
C
NO
NC
LOAD
CABLE OR BUSBAR
A
FROM PWR BD CHG-DISCH CKT
MULT TO FIG 5 & OTHER FIGS 8 (SAME PNL)
E
BR OR 20 BARE
24,48 OR 130
V
TO LOADS AS REQD
GRD
PART OF GND BAR

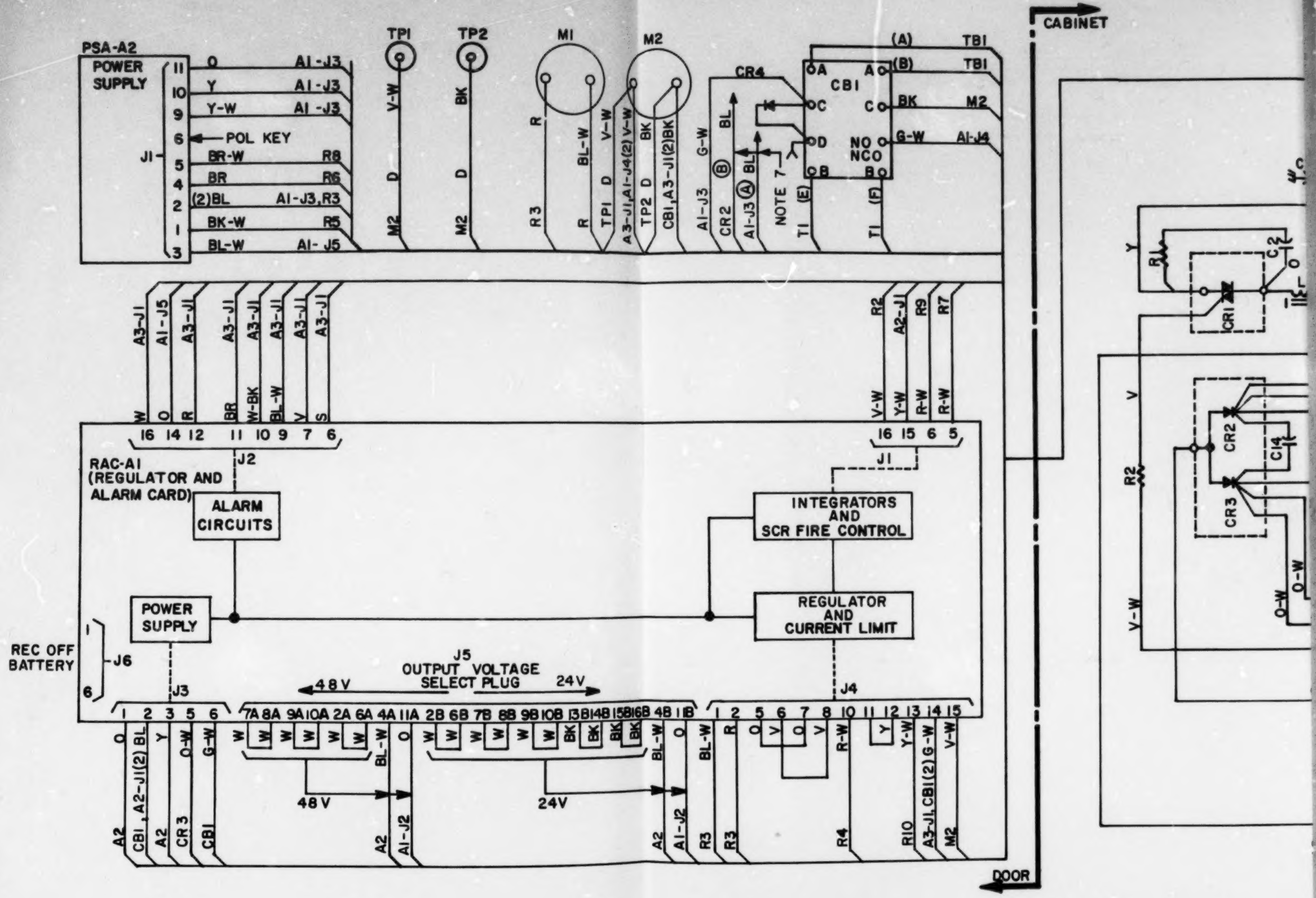
FIG 9

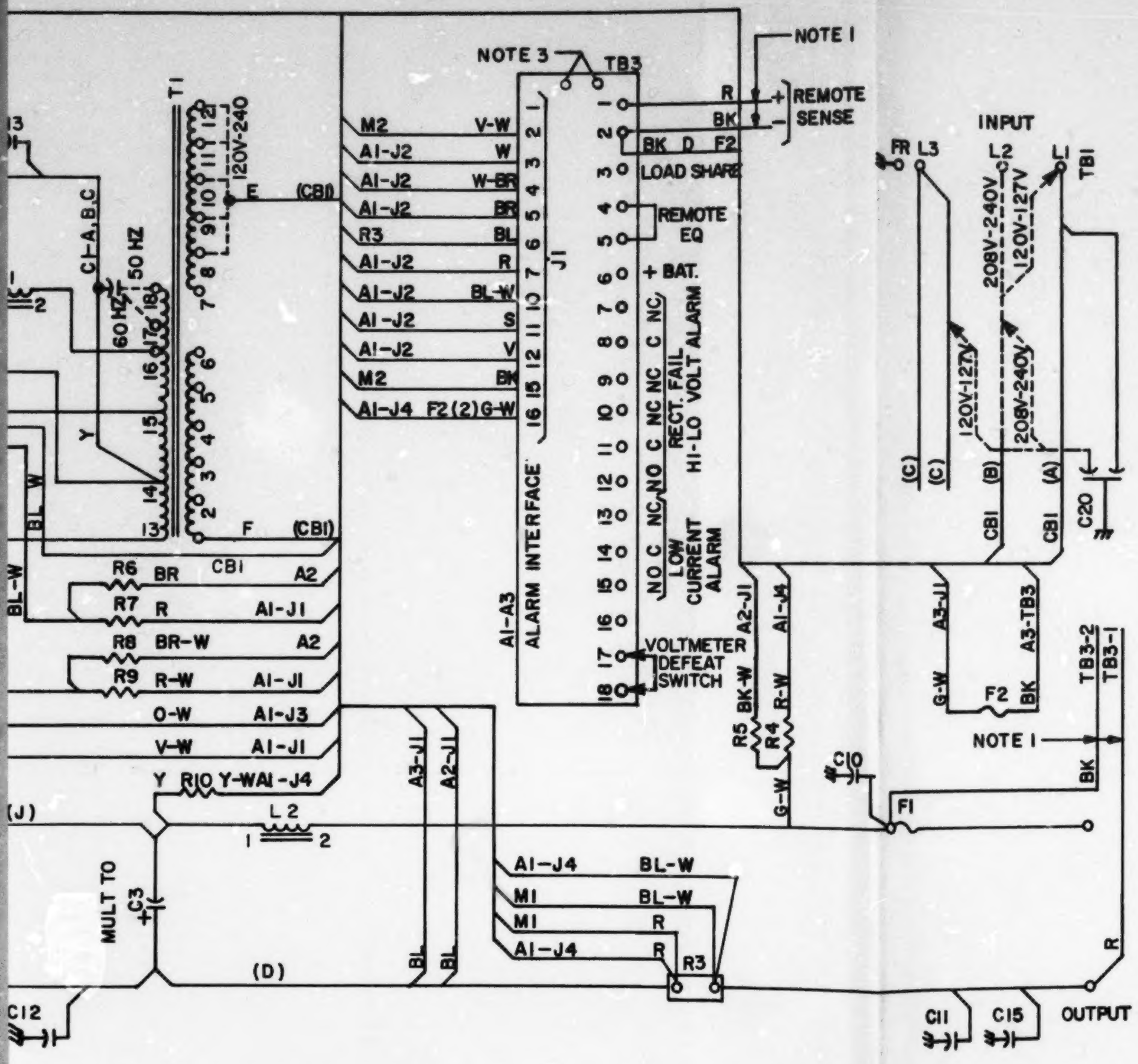
DISTRIBUTION
CKT BRKRS
(0-100 AMP)


MULT TO OTHER FIGS 9 (SAME PNL)
A
BUSBAR
LINE
NC
NO
C
LOAD
CABLE OR BUSBAR
A
FROM PWR BD CHG-DISCH CKT
MULTI TO FIG 5 & OTHER FIGS9 (SAME PNL)
E
BR OR 20 BARE
24,48 OR 130
V
TO LOADS AS REQD
GRD
PART OF GND BAR

EL8VS008

FIGURE FO-6. POWER BOARD DISTRIBUTION CIRCUIT.


PSA-A2
POWER SUPPLY
J1
11 O A1-J3
10 Y A1-J3
9 Y-W A1-J3
6 POL KEY
5 BR-W R8
4 BR R6
2 (2)BL A1-J3, R3
1 BK-W R5
3 BL-W A1-J5
TP1
TP2
M1
M2
V-W
BK
D
R
R3
BL-W
V-W
TP1 D
A3-J1, A1-J4 (2) V-W
BK
TP2 D
CB1, A3-J1 (2) BK
CR4
G-W
BL
A1-J3
CR2
A1-J3 Ⓐ BL
Ⓑ
NOTE 7
T1 (E)
T1 (F)
CB1
A
B
C
D
NO
NCO
(A) TB1
(B) TB1
BK M2
G-W A1-J4
CABINET
DOOR
A3-J1
A1-J5
A3-J1
A3-J1
A3-J1
A3-J1
A3-J1
A3-J1
W O R BR W-BK BL-W V S
16 14 12 11 10 9 7 6
J2
R2 A2-J1 R9 R7
V-W Y-W R-W R-W
16 15 6 5
J1
RAC-A1 (REGULATOR AND ALARM CARD)
ALARM CIRCUITS
INTEGRATORS AND SCR FIRE CONTROL
POWER SUPPLY
REGULATOR AND CURRENT LIMIT
REC OFF BATTERY
1
6
J6
J3
J5 OUTPUT VOLTAGE SELECT PLUG
48V
24V
J4
1 2 3 5 6
7A 8A 9A 10A 2A 6A 4A 11A 2B 6B 7B 8B 9B 10B 13B 14B 15B 16B 4B 11B
1 2 5 6 7 8 10 11 12 13 14 15
O BL Y O-W G-W
W W W W W W W W W W W W W W BK BK BK BK
BL-W O BL-W O
BL-W R O V O V R-W Y Y-W G-W V-W
A2 CB1, A2-J1 (2) A2 CR3 CB1
48V
A2 A1-J2
24V
A2 A1-J2
R3 R3 R4 R10 A3-J1, CB1 (2) M2
Y
R1
C2
CR1
V
CR2
C14
R2
CR3
V-W
O-W
O-W

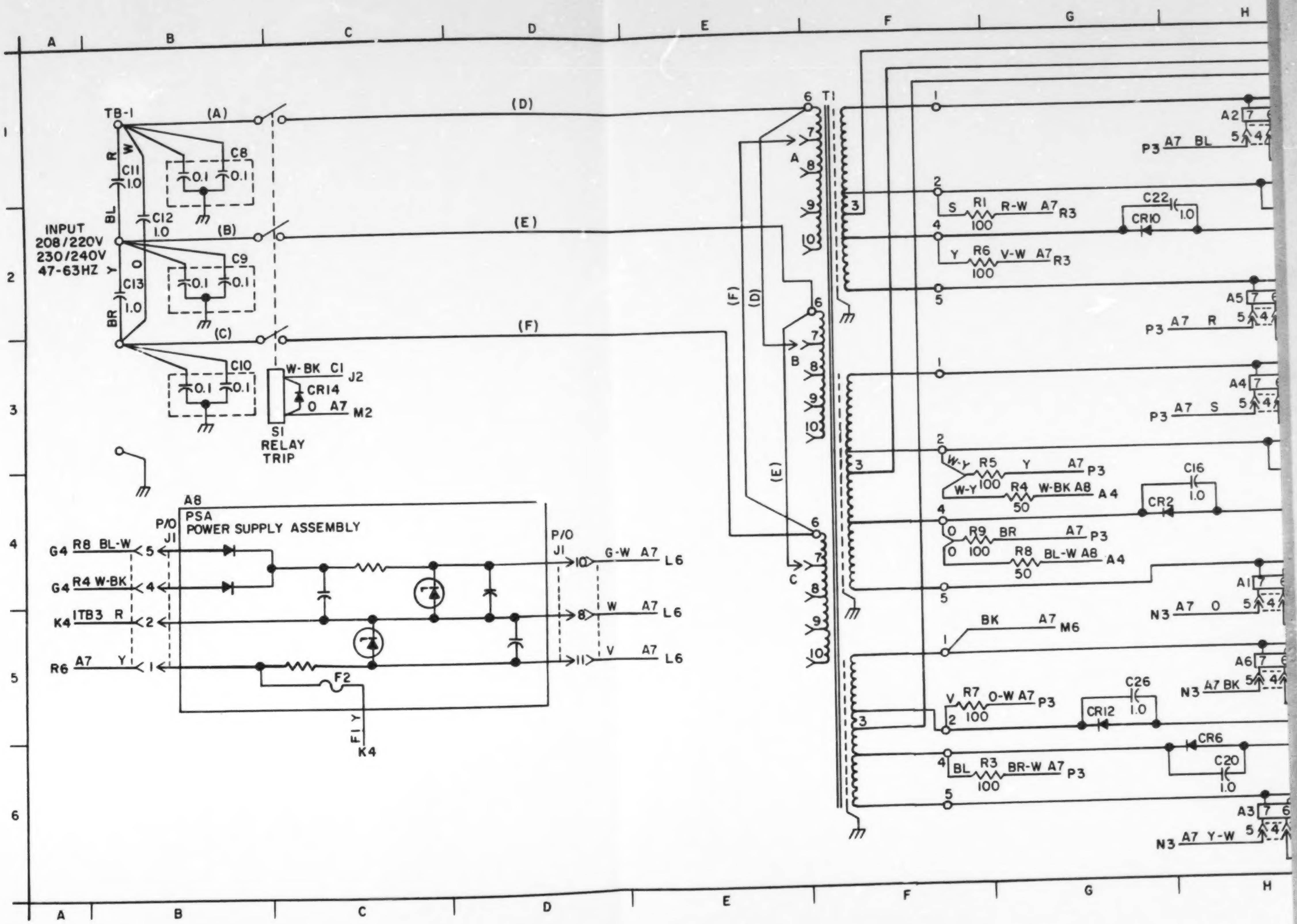

NOTE 3
TB3
NOTE 1
R
BK
+
−
REMOTE SENSE
BK D F2
LOAD SHARE
REMOTE EQ
+ BAT.
NC C NO
RECT. FAIL
HI-LO VOLT ALARM
NO C NC
LOW CURRENT ALARM
VOLTMETER DEFEAT SWITCH
J1
A1-A3
ALARM INTERFACE
M2
A1-J2
R3
A1-J4
F2(2)G-W
V-W
W
W-BR
BR
BL
R
BL-W
S
V
BK
T1
120V-240
E
(CB1)
C1-A,B,C
60 HZ
50 HZ
Y
F
(CB1)
CB1
R6
BR
A2
R7
R
A1-J1
R8
BR-W
A2
R9
R-W
A1-J1
O-W
A1-J3
V-W
A1-J1
Y
R10
Y-W A1-J4
(J)
L 2
MULT TO
C3
(D)
C12
A3-J1
A2-J1
BL
BL
A1-J4
BL-W
M1
BL-W
M1
R
A1-J4
R
R3
A2-J1
A1-J4
BK-W
R-W
R5
R4
G-W
C10
F1
INPUT
FR
L3
L2
L1
TB1
208V-240V
120V-127V
120V-127V
208V-240V
(C)
(C)
(B)
(A)
CB1
CB1
C20
A3-J1
A3-TB3
G-W
F2
BK
TB3-2
TB3-1
NOTE 1
BK
R
C11
C15
OUTPUT

NOTES:

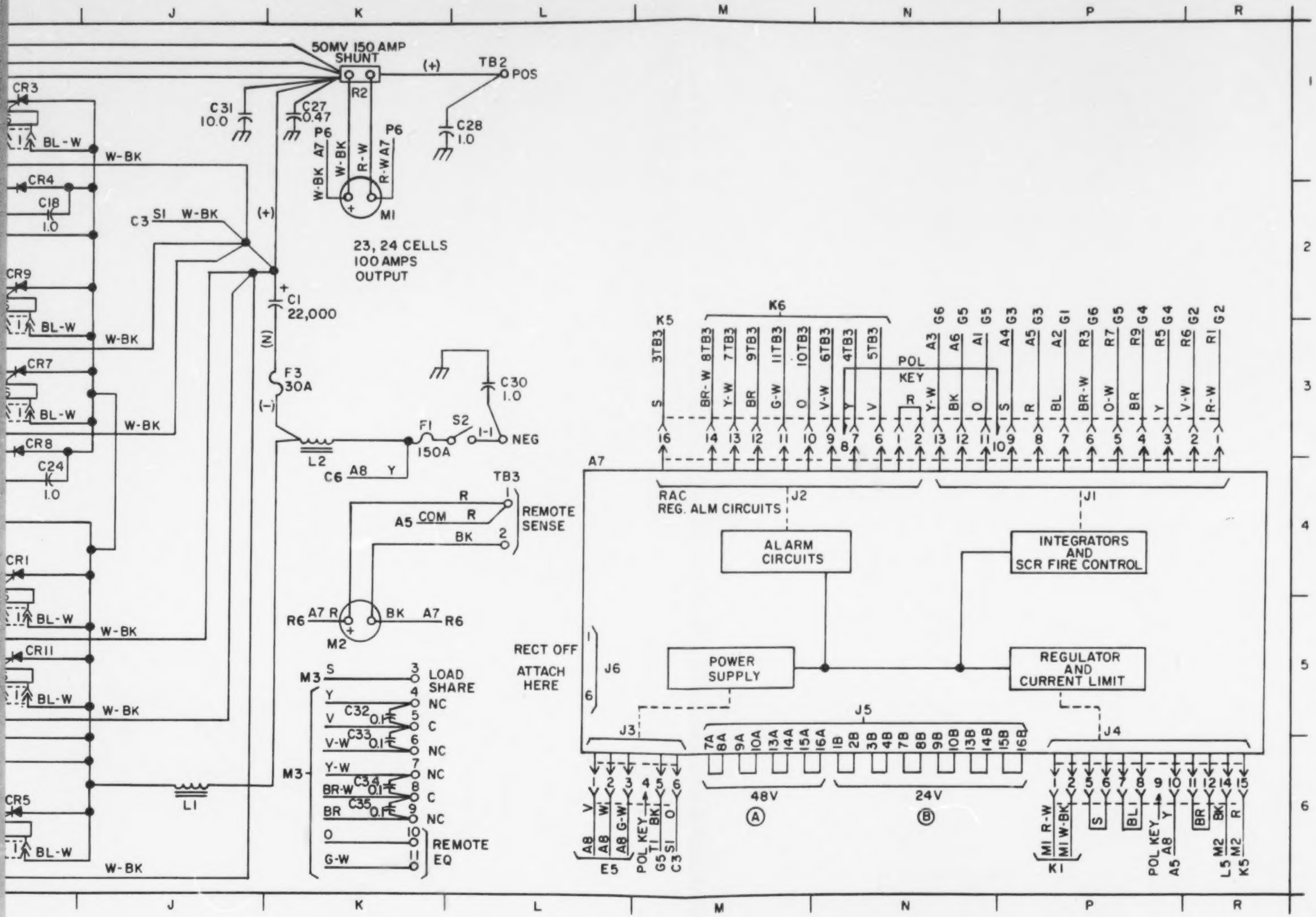
1. EQUIPMENT SUPPLIED WITH INTERNAL REFERENCE LEADS BETEEN TB3 REMOTE SENSE TERMINALS (1) AND (2) AND OUTLET TERMINALS REMOVE THESE WHEN EXTERNAL LEADS ARE USED.
2. TB1'S L3 IS NEUTRAL ON 120-127 AC INPUT ONLY.
3. STORE INTERNAL SENSE LEADS HERE.
4. CAP LEAD MUST BE MOVED FROM 18 TO 17 FOR 60 HZ OPERATION.
5. FACTORY ADJUSTMENT FOR 48V USE REMOVE 13-14 AND 15-16 FROM SOCKET J5.
6. D-INDICATES LEAD IS A JUMPER.
7. SLEEVE AND INSULATE BL WIRE WHEN Ⓑ OPTION IS INSTALLED, BL-W WIRE WHEN Ⓐ OPTION IS INSTALLED.

EL8VS009

FIGURE FO-7. PP-7694/U RECTIFIER SCHEMATIC.

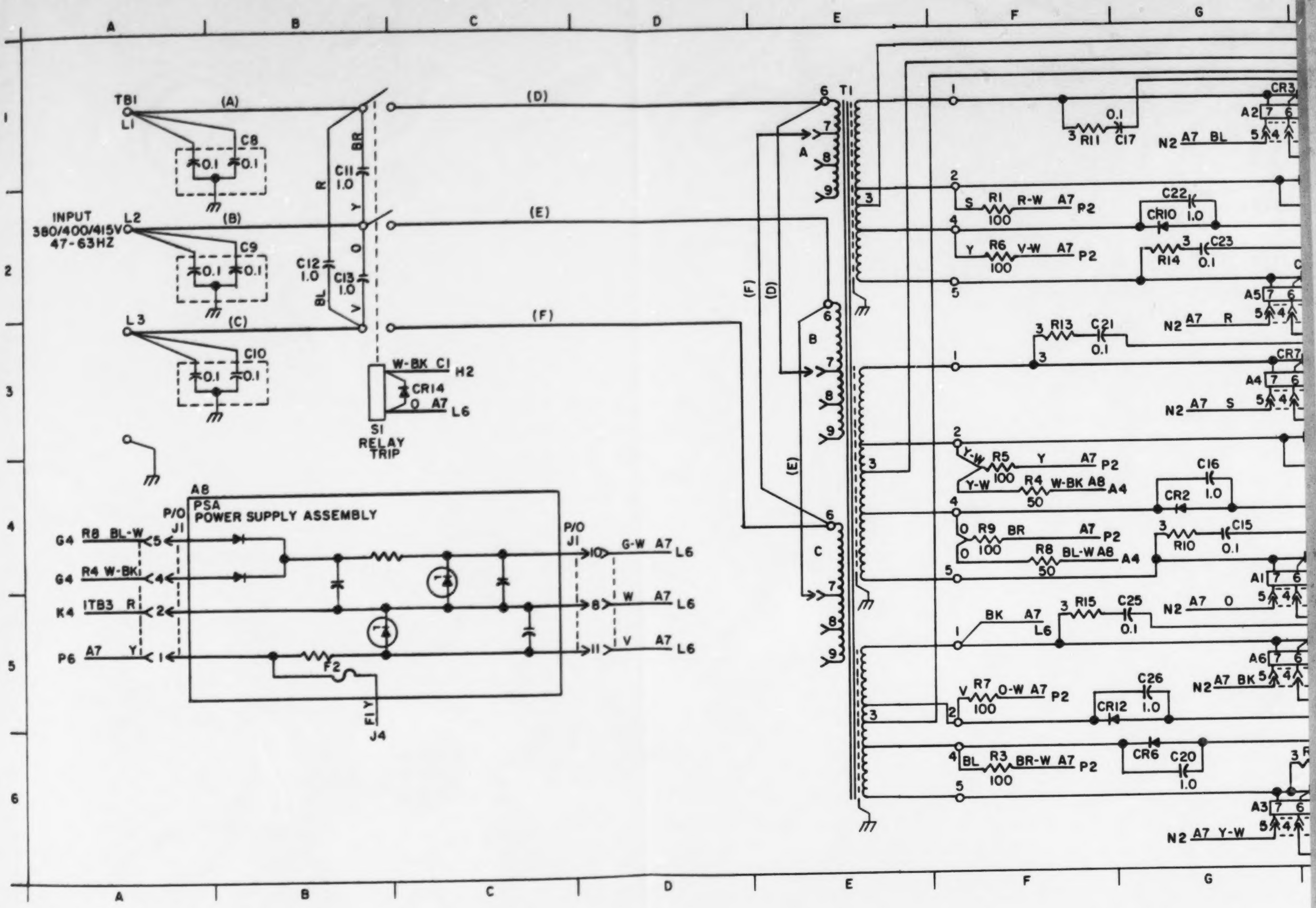


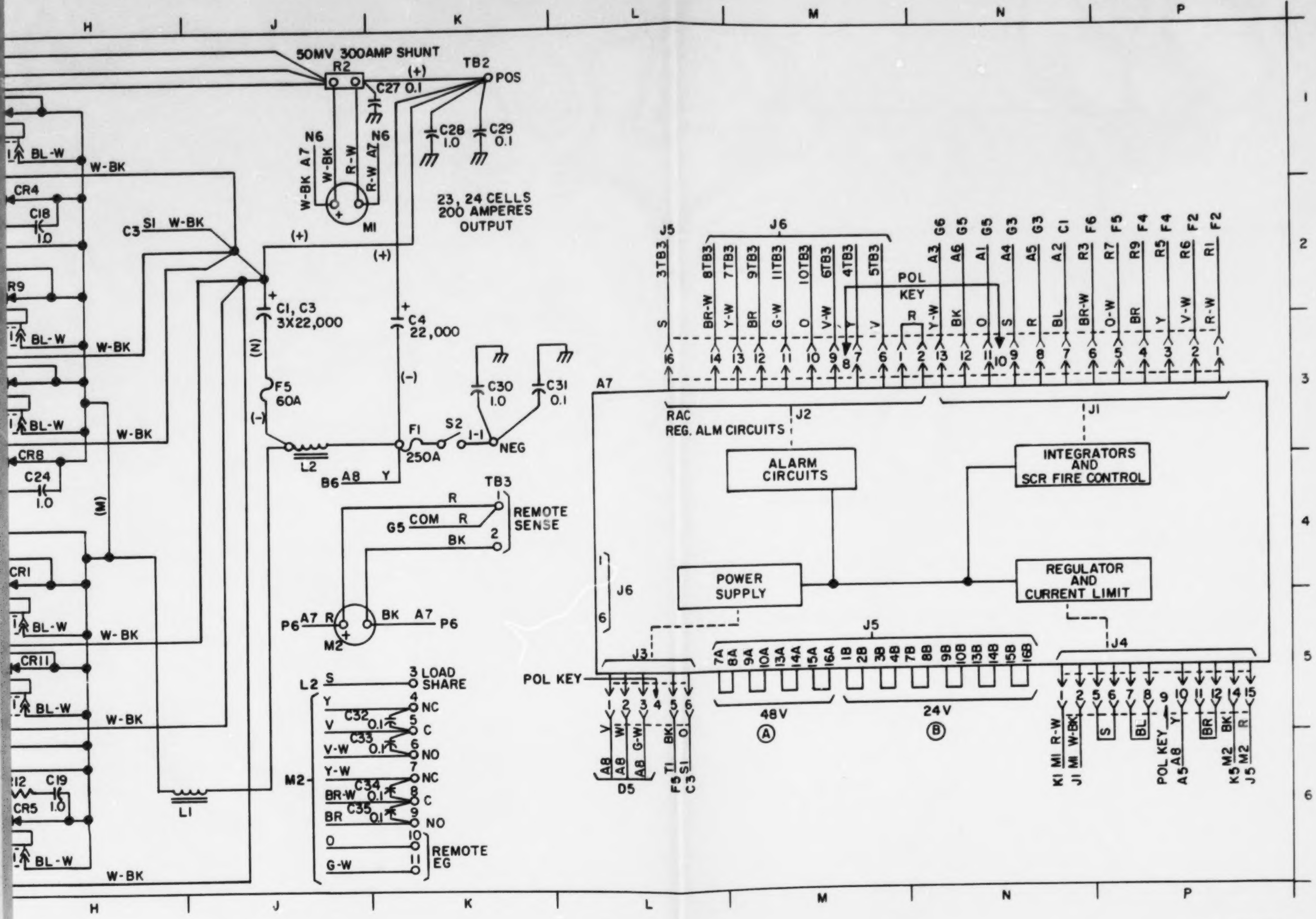
A
B
C
D
E
F
G
H
1
2
3
4
5
6
TB-1
(A)
(B)
(C)
(D)
(E)
(F)
R
W
C11
1.0
C8
0.1
0.1
BL
C12
1.0
INPUT
208/220V
230/240V
47-63HZ
O
Y
C9
0.1
0.1
C13
1.0
BR
C10
0.1
0.1
W-BK C1
J2
CR14
O A7
M2
S1
RELAY
TRIP
T1
6
7
8
9
10
A
B
C
3
1
2
4
5
S R1 100 R-W A7 R3
Y R6 100 V-W A7 R3
C22
1.0
CR10
A2
P3 A7 BL
A5
P3 A7 R
A4
P3 A7 S
W-Y R5 100 Y A7 P3
W-Y 100 R4 50 W-BK A8 A4
C16
1.0
CR2
O R9 100 BR A7 P3
O 100 R8 50 BL-W A8 A4
A1
N3 A7 O
BK A7 M6
A6
N3 A7 BK
V R7 100 O-W A7 P3
C26
1.0
CR12
CR6
C20
1.0
BL R3 100 BR-W A7 P3
A3
N3 A7 Y-W
A8
PSA
POWER SUPPLY ASSEMBLY
P/O
J1
G4 R8 BL-W 5
G4 R4 W-BK 4
K4 1TB3 R 2
R6 A7 Y 1
10 G-W A7 L6
8 W A7 L6
11 V A7 L6
F2
F1 Y
K4


J
K
L
M
N
P
R
1
2
3
4
5
6
50MV 150 AMP SHUNT
R2
(+)
TB2
POS
CR3
C31 10.0
C27 0.47
C28 1.0
P6
W-BK A7
W-BK
R-W
R-W A7
M1
BL-W
W-BK
CR4
C18 1.0
C3 S1 W-BK
23, 24 CELLS 100 AMPS OUTPUT
CR9
C1 22,000
(N)
F3 30A
(-)
CR7
C30 1.0
L2
F1 150A
S2
1-1
NEG
CR8
C24 1.0
C6 A8 Y
TB3
R
A5 COM R
BK
REMOTE SENSE
CR1
R6 A7 R
BK A7 R6
M2
CR11
M3 S
LOAD SHARE
Y
NC
V C32 0.1
C
V-W C33 0.1
NC
Y-W
C34 0.1
BR-W
C35 0.1
BR
O
REMOTE EQ
G-W
CR5
L1
RECT OFF ATTACH HERE
J6
K5
3TB3
S
K6
8TB3 BR-W
7TB3 Y-W
9TB3 BR
11TB3 G-W
10TB3 O
6TB3 V-W
4TB3 Y
5TB3 V
POL KEY
R
A3 G6 Y-W
A6 G5 BK
A1 G5 O
A4 G3 S
A5 G3 R
A2 G1 BL
R3 G6 BR-W
R7 G5 O-W
R9 G4 BR
R5 G4 Y
R6 G2 V-W
R1 G2 R-W
A7
RAC REG. ALM CIRCUITS
J2
J1
ALARM CIRCUITS
INTEGRATORS AND SCR FIRE CONTROL
POWER SUPPLY
REGULATOR AND CURRENT LIMIT
J3
J5
J4
7A 8A 9A 10A 13A 14A 15A 16A
1B 2B 3B 4B 7B 8B 9B 10B 13B 14B 15B 16B
48V
Ⓐ
24V
Ⓑ
V W G-W
A8 A8 A8
E5
POL KEY T1 BK O
G5 S1 C3
M1 R-W
M1 W-BK
K1
S
BL
POL KEY Y
A8 A5
BR BK R
L5 M2 M2 K5

EL8VS010

FIGURE FO-8. PP-7695/U RECTIFIER SCHEMATIC.


A
B
C
D
E
F
G
1
2
3
4
5
6
TB1
L1
(A)
C8
0.1
0.1
INPUT
380/400/415V
47-63HZ
L2
(B)
C9
0.1
0.1
L3
(C)
C10
0.1
0.1
R
BR
C11
1.0
Y
O
C12
1.0
BL
C13
1.0
V
(D)
(E)
(F)
W-BK C1
H2
CR14
O A7
L6
S1
RELAY
TRIP
A8
PSA
POWER SUPPLY ASSEMBLY
P/O
J1
G4 R8 BL-W
5
G4 R4 W-BK
4
K4 1TB3 R
2
P6 A7 Y
1
F2
F1 Y
J4
P/O
J1
10
G-W A7
L6
8
W A7
L6
11
V A7
L6
6 T1
7
8
9
A
3
(F)
(D)
(E)
6
7
8
9
B
6
7
8
9
C
3
3
1
0.1
3 R11
C17
CR3
A2 7 6
N2 A7 BL
5 4
2
S R1 R-W A7
100
P2
C22
CR10 1.0
4
Y R6 V-W A7
100
P2
R14 3 C23
0.1
5
A5 7 6
3 R13 C21
0.1
N2 A7 R
5 4
1
3
CR7
A4 7 6
N2 A7 S
5 4
2
Y-W R5 Y A7
100
P2
Y-W R4 W-BK A8
50
A4
C16
CR2 1.0
4
O R9 BR A7
100
P2
O R8 BL-W A8
50
A4
3
R10 C15
0.1
5
A1 7 6
BK A7
L6
3 R15 C25
0.1
N2 A7 O
5 4
1
A6 7 6
N2 A7 BK
5 4
V R7 O-W A7
100
P2
C26
CR12 1.0
2
3
4 BL R3 BR-W A7
100
P2
CR6 C20
1.0
5
3 R
A3 7 6
N2 A7 Y-W
5 4

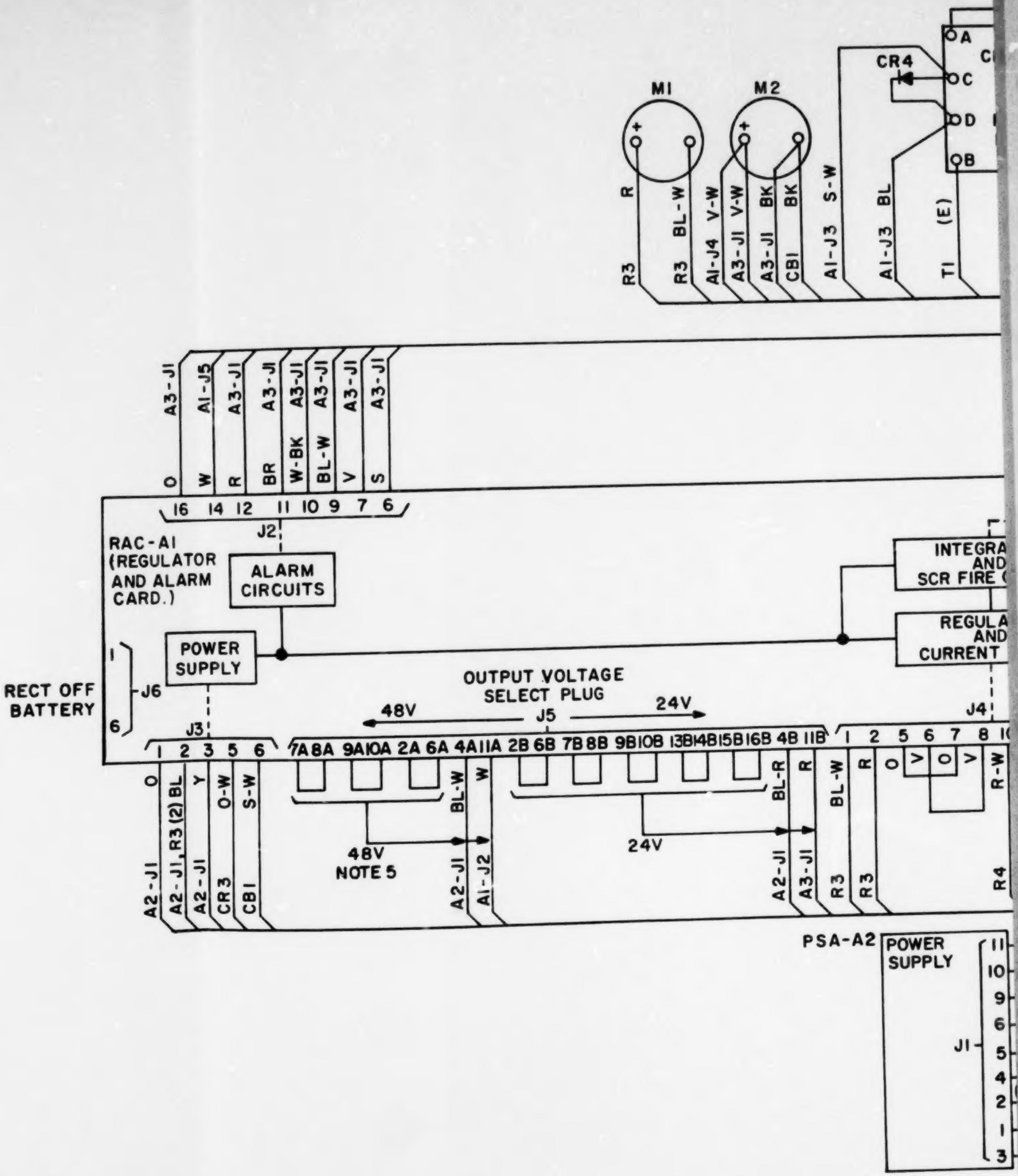

H
J
K
L
M
N
P
1
2
3
4
5
6
50MV 300AMP SHUNT
R2
(+)
TB2
POS
C27 0.1
C28 1.0
C29 0.1
N6
A7
W-BK
R-W
M1
23, 24 CELLS
200 AMPERES
OUTPUT
BL-W
W-BK
CR4
C18 1.0
C3 S1 W-BK
R9
C1, C3
3X22,000
C4
22,000
(N)
F5
60A
(-)
L2
B6 A8 Y
F1
250A
S2
1-1
NEG
C30 1.0
C31 0.1
CR8
C24 1.0
(M)
TB3
R
G5 COM R
BK
REMOTE SENSE
CR1
CR11
P6 A7 R
M2
BK A7 P6
R12 C19 1.0
CR5
L1
L2 S 3 LOAD SHARE
Y 4 NC
V C32 0.1 5 C
V-W C33 0.1 6 NO
M2 Y-W 7 NC
BR-W C34 0.1 8 C
BR C35 0.1 9 NO
O 10
G-W 11 REMOTE EG
J5
J6
3TB3
8TB3
7TB3
9TB3
11TB3
10TB3
6TB3
4TB3
5TB3
POL KEY
A3 G6
A6 G5
A1 G5
A4 G3
A5 G3
A2 C1
R3 F6
R7 F5
R9 F4
R5 F4
R6 F2
R1 F2
A7
RAC
REG. ALM CIRCUITS
J2
J1
ALARM CIRCUITS
INTEGRATORS AND SCR FIRE CONTROL
POWER SUPPLY
REGULATOR AND CURRENT LIMIT
J6
J5
J3
J4
POL KEY
7A 8A 9A 10A 13A 14A 15A 16A
1B 2B 3B 4B 7B 8B 9B 10B 13B 14B 15B 16B
48V
Ⓐ
24V
Ⓑ
A8 A8 A8
D5
F5 T1
C3 S1
K1 M1
J1 M
POL KEY
A5 A8
K5 M2
J5 M2

EL8VS011

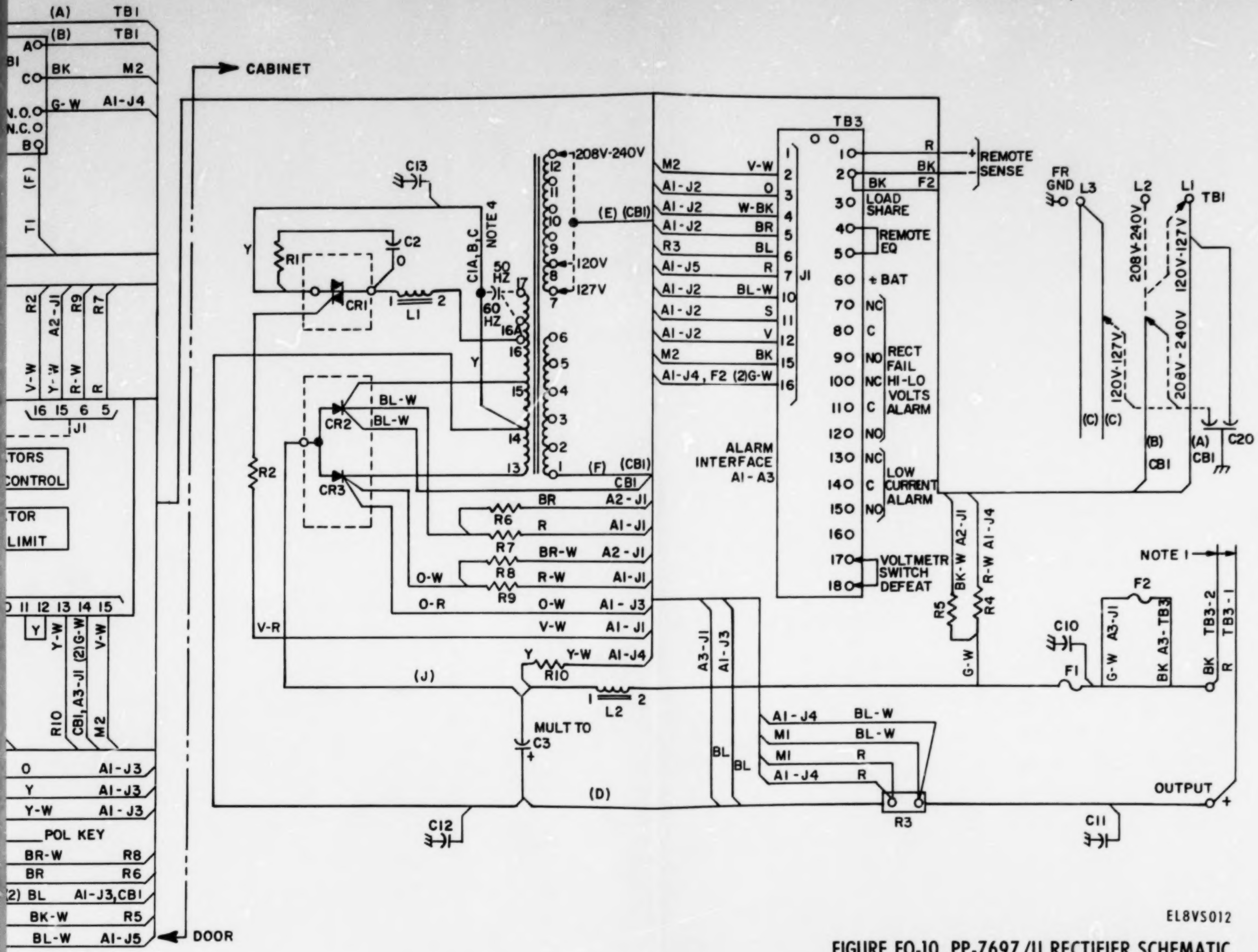
FIGURE FO-9. PP-7696/U RECTIFIER SCHEMATIC

NOTES:

1. EQUIPMENT SUPPLIED WITH INTERNAL REFERENCE LEADS BETWEEN TB3 REMOTE SENSE TERMINALS (1) AND (2) AND OUTPUT TERMINALS. REMOVE THESE LEADS WHEN EXTERNAL REFERENCE LEADS ARE USED.
2. TB1'S L3 IS NEUTRAL ON 100, 115, 120, AND 127 VAC INPUT ONLY.
3. STORE INTERNAL SENSE LEADS HERE
4. CAP LEAD MUST BE MOVED FROM 17 TO 16A FOR 60 HZ OPERATIONS.
5. FACTORY ADJUSTMENT: FOR 48V USE. REMOVE 13-14 AND 15-16 FROM SOCKET J5.
6. SLEEVE AND INSULATE BL-W WIRE USED ON 24V ONLY.

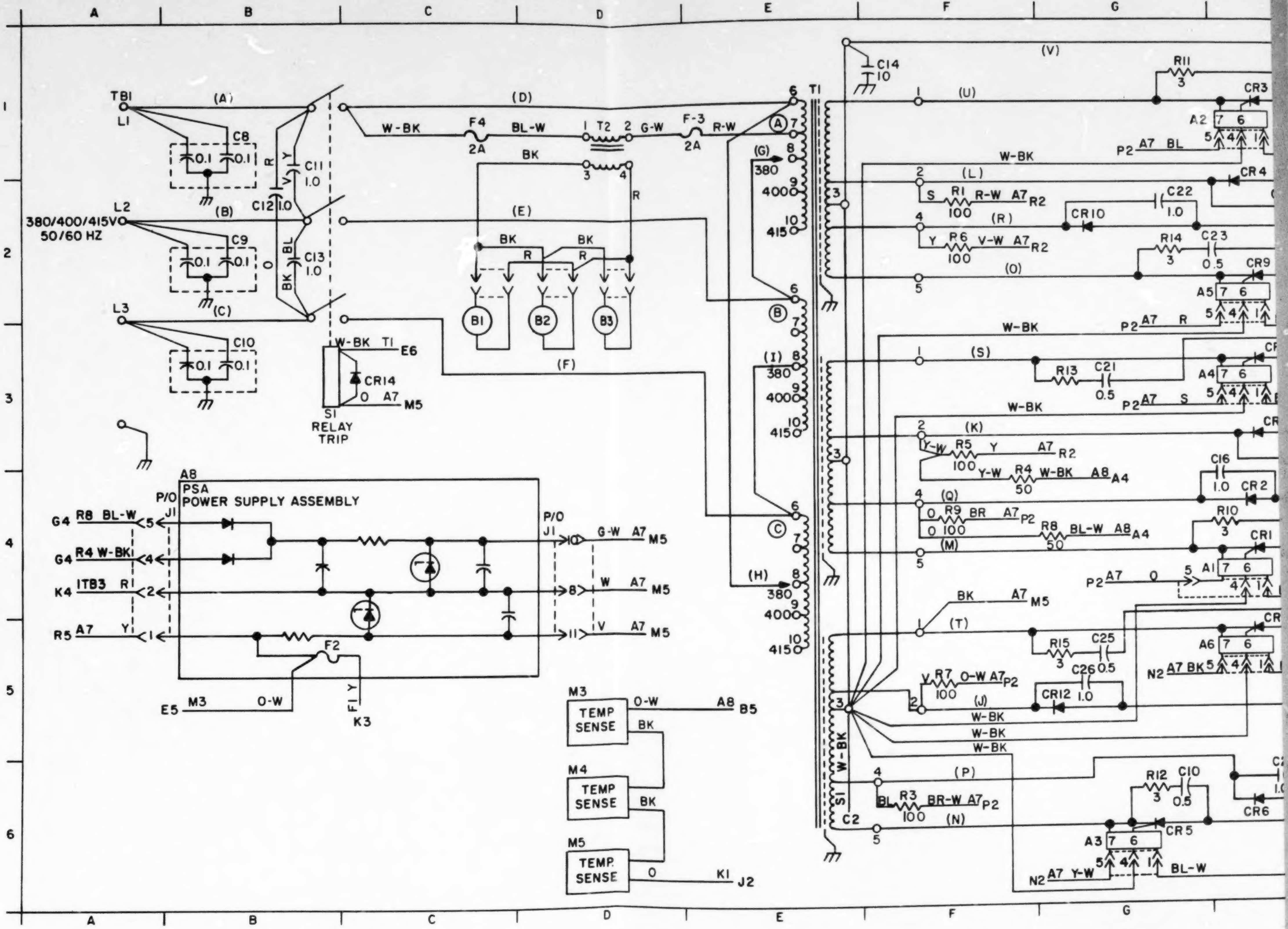


M1
M2
CR4
A
C
D
B
R3 R
R3 BL-W
A1-J4 V-W
A3-J1 V-W
A3-J1 BK
CB1 BK
A1-J3 S-W
A1-J3 BL
T1 (E)
A3-J1 O
A1-J5 W
A3-J1 R
A3-J1 BR
A3-J1 W-BK
A3-J1 BL-W
A3-J1 V
A3-J1 S
16 14 12 11 10 9 7 6
J2
RAC-A1 (REGULATOR AND ALARM CARD.)
ALARM CIRCUITS
POWER SUPPLY
RECT OFF BATTERY
J6
1
6
J3
1 2 3 5 6
OUTPUT VOLTAGE SELECT PLUG
48V
J5
24V
7A 8A 9A 10A 2A 6A 4A 11A 2B 6B 7B 8B 9B 10B 13B 14B 15B 16B 4B 11B
J4
1 2 5 6 7 8
INTEGRA AND SCR FIRE
REGULA AND CURRENT
A2-J1 O
A2-J1, R3 (2) BL
A2-J1 Y
CR3 O-W
CB1 S-W
A2-J1 BL-W
A1-J2 W
48V NOTE 5
24V
A2-J1 BL-R
A3-J1 R
R3 BL-W
R3 R
O
V
O
V
R4 R-W
PSA-A2
POWER SUPPLY
J1
11 10 9 6 5 4 2 1 3

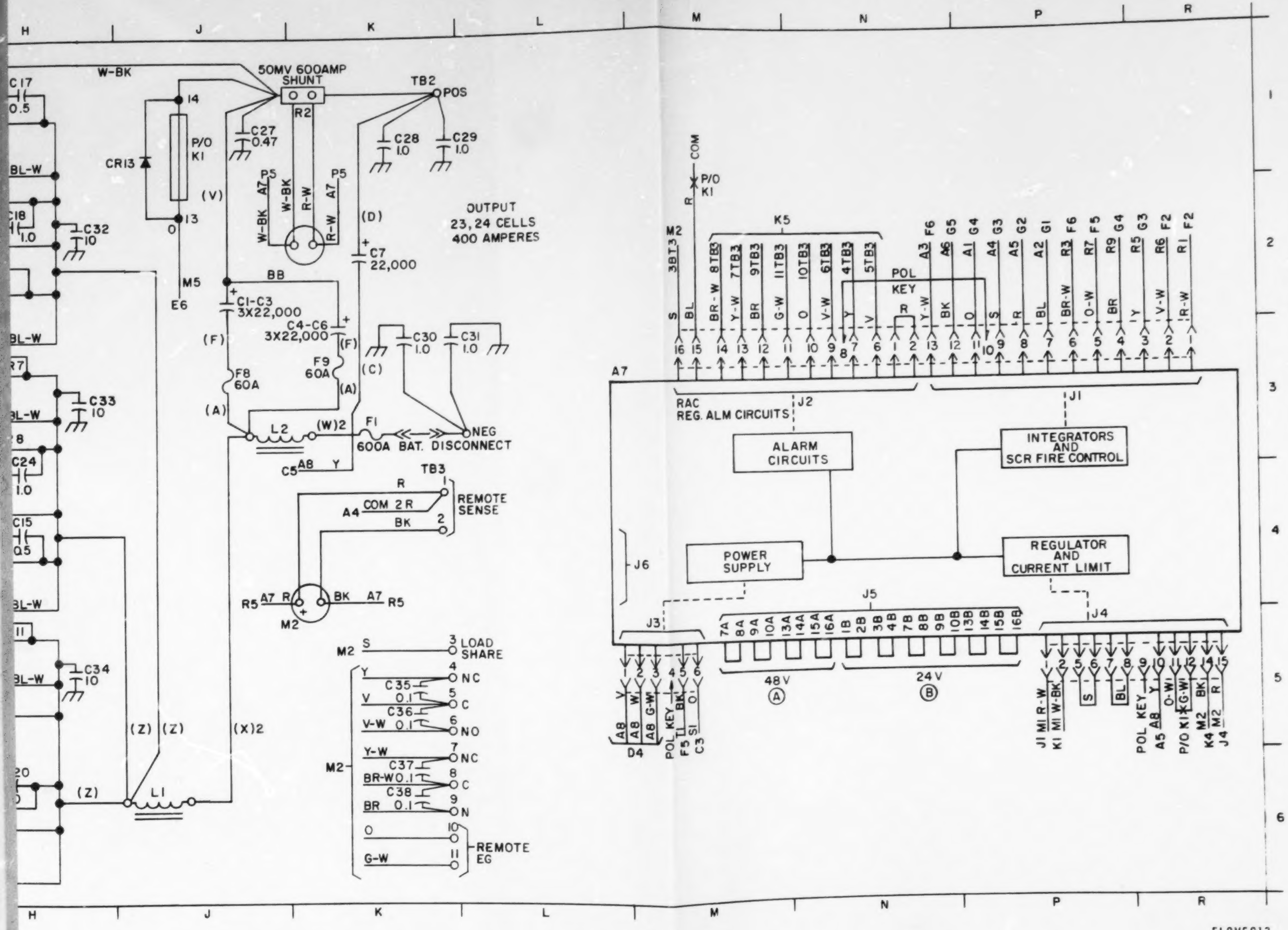

CABINET
DOOR
(A) TB1
(B) TB1
BK M2
G-W A1-J4
A
C
N.O.
N.C.
B
(F)
T1
R2
A2-J1
R9
R7
V-W
Y-W
R-W
R
16 15 6 5
J1
TORS
CONTROL
TOR
LIMIT
11 12 13 14 15
Y
Y-W
(2)G-W
V-W
R10
CB1, A3-J1
M2
O A1-J3
Y A1-J3
Y-W A1-J3
POL KEY
BR-W R8
BR R6
(2) BL A1-J3,CB1
BK-W R5
BL-W A1-J5
C13
C2
R1
CR1
L1
CR2
CR3
R2
BL-W
C1A,B,C
NOTE 4
50 HZ
60 HZ
17
16A
16
15
14
13
208V-240V
120V
127V
(E) (CB1)
(F) (CB1)
CB1
BR A2-J1
R6
R A1-J1
R7
BR-W A2-J1
R8
R-W A1-J1
O-W
R9
O-R
O-W A1-J3
V-R
V-W A1-J1
Y Y-W A1-J4
R10
(J)
L2
MULT TO C3
C12
(D)
R3
M2 V-W 1
A1-J2 O 3
A1-J2 W-BK 4
A1-J2 BR 5
R3 BL 6
A1-J5 R 7
A1-J2 BL-W 10
A1-J2 S 11
A1-J2 V 12
M2 BK 15
A1-J4, F2 (2)G-W 16
J1
ALARM INTERFACE A1-A3
TB3
1 R + REMOTE SENSE
2 BK
BK F2
3 LOAD SHARE
4 REMOTE EQ
5
6 ± BAT
7 NC
8 C
9 NO RECT FAIL
10 NC HI-LO VOLTS ALARM
11 C
12 NO
13 NC
14 C LOW CURRENT ALARM
15 NO
16
17 VOLTMETR SWITCH DEFEAT
18
A3-J1
A1-J3
BL
A1-J4 BL-W
M1 BL-W
M1 R
A1-J4 R
BK-W A2-J1
R-W A1-J4
R5
R4
G-W
FR GND
L3
L2
L1
TB1
208V-240V
120V-127V
(C) (C)
(B) CB1
(A) CB1
C20
NOTE 1
F2
C10
F1
G-W A3-J1
BK A3-TB3
TB3-2 BK
TB3-1 R
OUTPUT +
C11
C3 +

EL8VS012

FIGURE FO-10. PP-7697/U RECTIFIER SCHEMATIC.

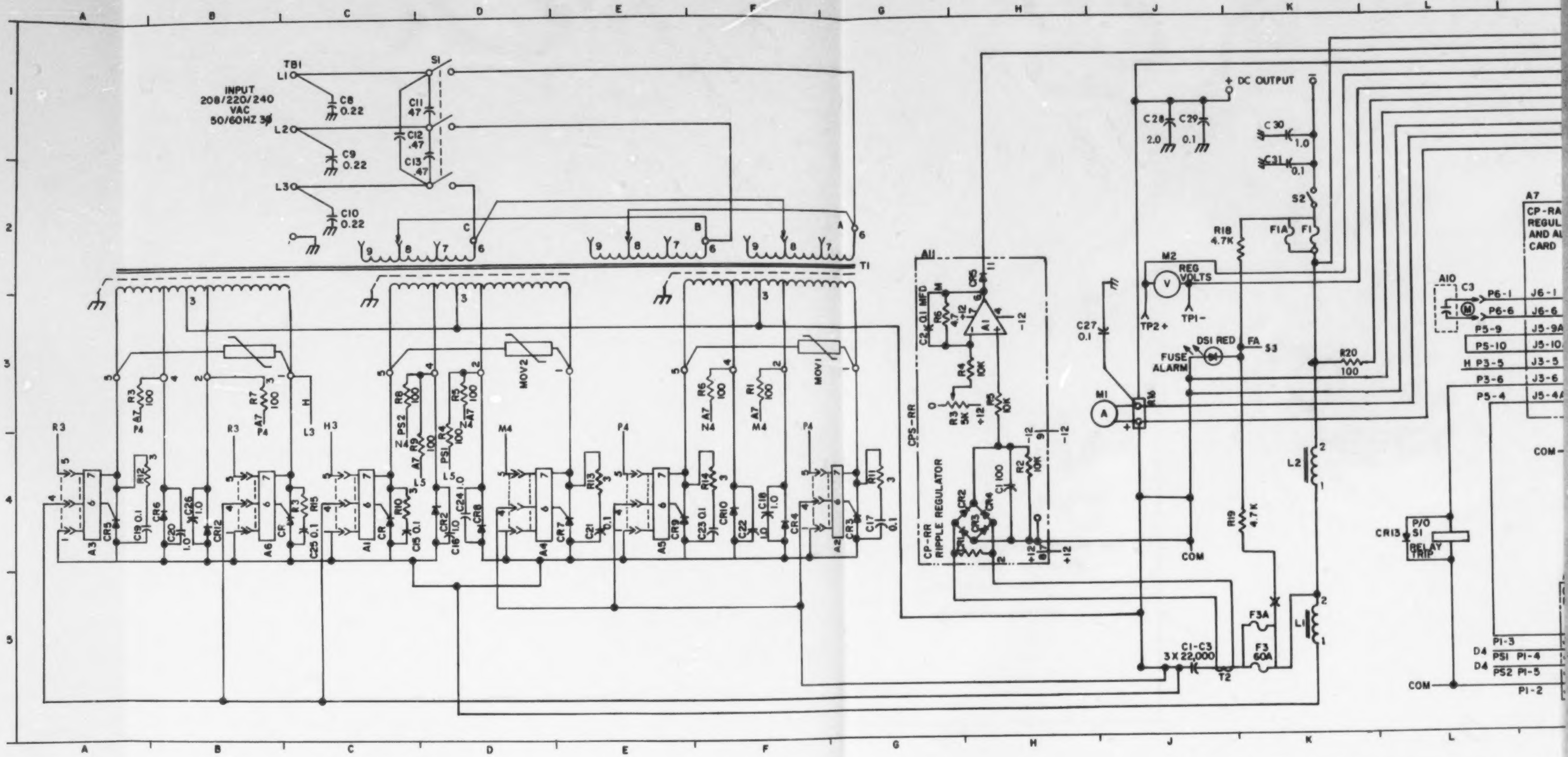


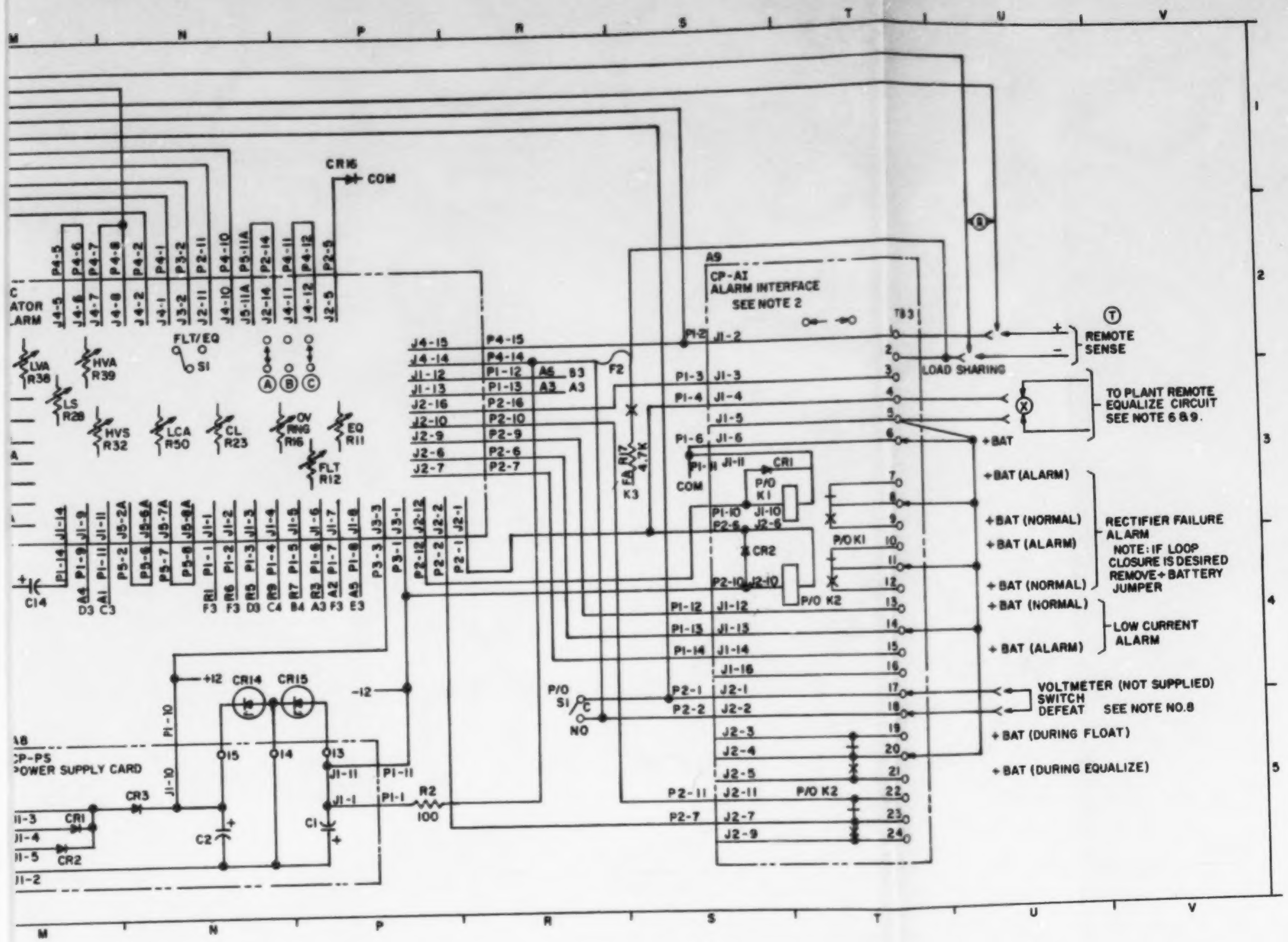
A
B
C
D
E
F
G
1
2
3
4
5
6
TB1
L1
L2
L3
380/400/415V
50/60 HZ
(A)
(B)
(C)
(D)
(E)
(F)
(G)
(H)
(I)
C8
C9
C10
0.1
C11 1.0
C12 1.0
C13 1.0
R
Y
V
BL
O
BK
W-BK
F4 2A
BL-W
T2
G-W
F-3 2A
R-W
B1
B2
B3
S1 RELAY TRIP
T1 E6
CR14
O A7 M5
A8
PSA
POWER SUPPLY ASSEMBLY
P/O J1
G4 R8 BL-W
G4 R4 W-BK
K4 1TB3 R
R5 A7 Y
G-W A7 M5
W A7 M5
V A7 M5
F2
E5 M3 O-W
F1 Y K3
M3 TEMP SENSE
M4 TEMP SENSE
M5 TEMP SENSE
O-W A8 B5
O K1 J2
T1
380
400
415
C14 10
(V)
(U)
(L)
(R)
(O)
(S)
(K)
(Q)
(M)
(T)
(J)
(P)
(N)
R11 3
CR3
A2
P2 A7 BL
R1 100 R-W A7 R2
R6 100 V-W A7 R2
C22 1.0
CR10
R14 3
C23 0.5
CR9
A5
P2 A7 R
R13
C21 0.5
A4
P2 A7 S
R5 100 Y A7 R2
R4 50 Y-W W-BK A8 A4
C16 1.0
CR2
R9 100 BR A7 P2
R8 50 BL-W A8 A4
R10 3
CR1
A1
P2 A7 O
BK A7 M5
R15 3
C25 0.5
A6
N2 A7 BK
R7 100 O-W A7 P2
C26 1.0
CR12
R12 3
C10 0.5
R3 100 BR-W A7 P2
CR5
CR6
A3
N2 A7 Y-W
BL-W
S1
C2


H
J
K
L
M
N
P
R
1
2
3
4
5
6
W-BK
50MV 600AMP
SHUNT
R2
TB2
POS
C17
0.5
C27
0.47
C28
1.0
C29
1.0
14
13
P/O
K1
CR13
BL-W
(V)
P5
A7
W-BK
R-W
C18
1.0
C32
10
(D)
OUTPUT
23, 24 CELLS
400 AMPERES
+
C7
22,000
M5
E6
BB
C1-C3
3X22,000
C4-C6
3X22,000
(F)
F8
60A
F9
60A
(C)
(A)
C30
1.0
C31
1.0
C33
10
L2
(W)2
F1
600A
BAT. DISCONNECT
NEG
C24
1.0
C5
A8
Y
TB3
R
COM 2 R
A4
BK
REMOTE
SENSE
C15
0.5
R5
A7
M2
C34
10
S
LOAD
SHARE
Y
C35
0.1
NC
V
C
C36
V-W
NO
Y-W
C37
BR-W
C38
BR
N
O
G-W
REMOTE
EG
(Z)
(X)2
L1
COM
P/O
K1
M2
3BT3
K5
BR-W 8TB3
Y-W 7TB3
BR 9TB3
G-W 11TB3
O 10TB3
V-W 6TB3
Y 4TB3
V 5TB3
POL
KEY
A3 F6
A6 G5
A1 G4
A4 G3
A5 G2
A2 G1
R3 F6
R7 F5
R9 G4
R5 G3
R6 F2
R1 F2
A7
RAC
REG. ALM CIRCUITS
J2
J1
ALARM
CIRCUITS
INTEGRATORS
AND
SCR FIRE CONTROL
POWER
SUPPLY
REGULATOR
AND
CURRENT LIMIT
J6
J3
J5
J4
7A 8A 9A 10A 13A 14A 15A 16A
1B 2B 3B 4B 7B 8B 9B 10B 13B 14B 15B 16B
48V
Ⓐ
24V
Ⓑ
D4
POL KEY
F5 T1
S1
C3
J1 M1 R-W
K1 M1 W-BK
A5
P/O K1
K4 M2
J4

EL8VS013

FIGURE FO-11. PP-7698/U RECTIFIER SCHEMATIC.

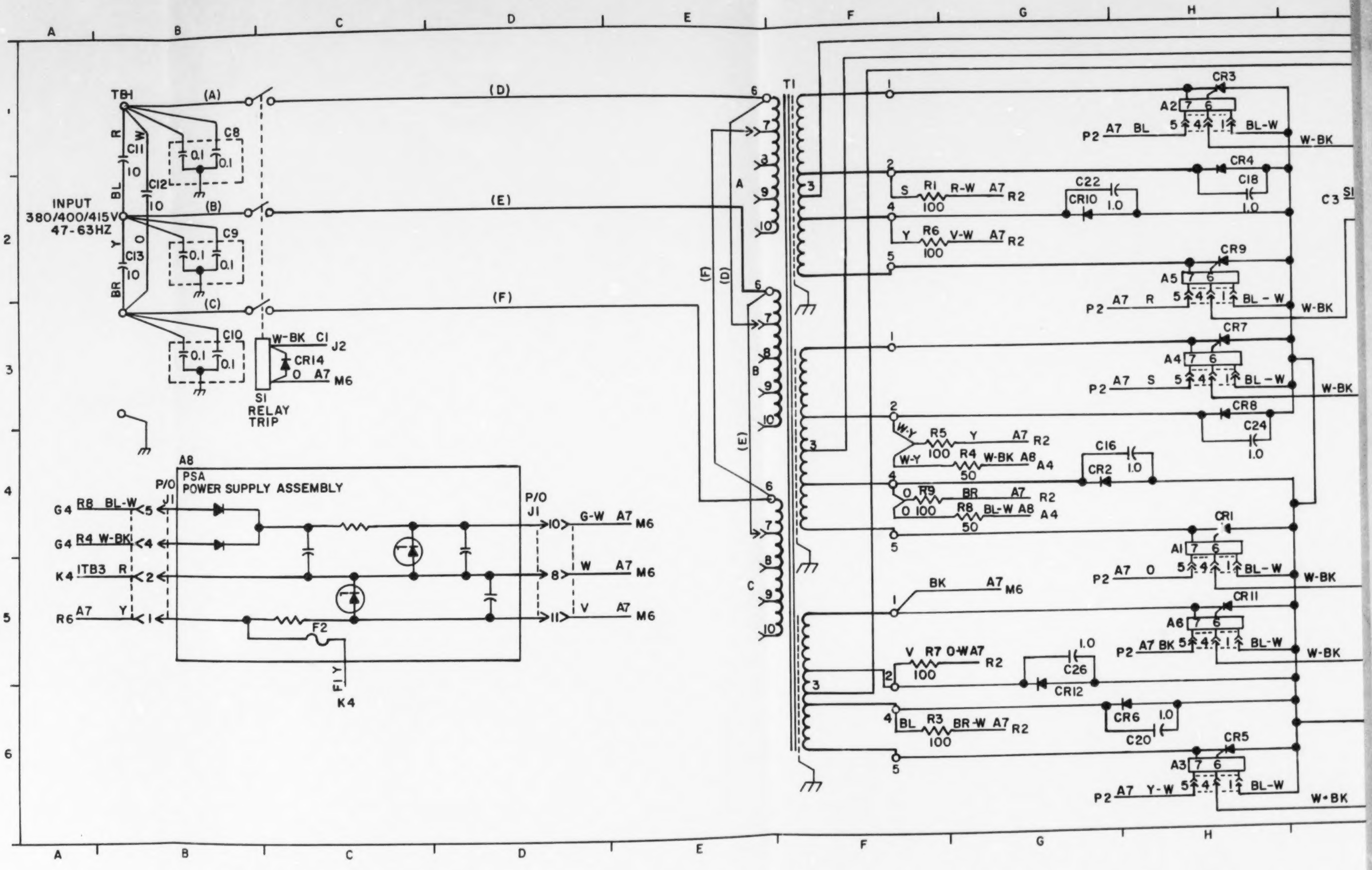

A B C D E F G H J K L
1 2 3 4 5
TB1
L1
L2
L3
INPUT
208/220/240
VAC
50/60HZ 3∅
C8 0.22
C9 0.22
C10 0.22
S1
C11 .47
C12 .47
C13 .47
T1
MOV2
MOV1
A3
A6
A1
A4
A5
A2
CR5 CR6 CR12 CR7 CR8 CR9 CR10 CR3 CR4 CR2
C19 0.1
C20 1.0
C26 1.0
C25 0.1
C15 0.1
C16 1.0
C24 1.0
C21 0.1
C23 0.1
C22 1.0
C18 1.0
C17 0.1
R3 100
R7 100
R8 100
R5 100
R6 100
R1 100
R12
R10
R13
R14
R11
R15
A7 P4
A7 M4
Z4
PS1
PS2
H3
L3
L5
M4
P4
A11
CPS-RR
CP-RR
RIPPLE REGULATOR
C2 .01 MFD
R6 4.7
R4 10K
R3 5K
R5 10K
R2 10K
C1 100
CR1 CR2 CR3 CR4
+12
-12
COM
+ DC OUTPUT
C28 2.0
C29 0.1
C30 1.0
C31 0.1
S2
R18 4.7K
R19 4.7K
R20 100
F1A F1
F3A
F3 60A
M2
REG VOLTS
V
TP2 +
TP1 -
C27 0.1
DS1 RED
FUSE ALARM
FA
S3
M1
A
L2
L1
C1-C3
3 X 22,000
T2
A10
C3
P6-1 J6-1
P6-6 J6-6
P5-9 J5-9A
P5-10 J5-10
H P3-5 J3-5
P3-6 J3-6
P5-4 J5-4A
A7
CP-RA
REGUL
AND AL
CARD
COM
CR13
P/O
S1
RELAY
TRIP
P1-3
D4 PS1 P1-4
D4 PS2 P1-5
COM
P1-2


M
N
P
R
S
T
U
V
1
2
3
4
5
CR16
COM
A9
CP-A1
ALARM INTERFACE
SEE NOTE 2
TB3
REMOTE SENSE
LOAD SHARING
TO PLANT REMOTE EQUALIZE CIRCUIT SEE NOTE 6 & 9.
+BAT
+BAT (ALARM)
+BAT (NORMAL)
+BAT (ALARM)
+BAT (NORMAL)
RECTIFIER FAILURE ALARM
NOTE: IF LOOP CLOSURE IS DESIRED REMOVE + BATTERY JUMPER
+BAT (NORMAL)
+BAT (ALARM)
LOW CURRENT ALARM
VOLTMETER (NOT SUPPLIED)
SWITCH DEFEAT
SEE NOTE NO.8
+BAT (DURING FLOAT)
+BAT (DURING EQUALIZE)
FLT/EQ
S1
LVA R38
HVA R39
LS R28
HVS R32
LCA R50
CL R23
OV RNG R16
EQ R11
FLT R12
F2
FA R17 4.7K
K3
COM
P/O K1
CR1
CR2
P/O K2
P/O S1
C
NO
A8
CP-PS
POWER SUPPLY CARD
CR1
CR2
CR3
C2
C1
C14
CR14
CR15
+12
-12
R2
100
EL8VS014

NOTES:

1. EQUIPMENT SUPPLIED WITH INTERNAL VOLTAGE SENSE LEADS BETWEEN TB3 REMOTE SENSE TERMINAL (1) AND (2) AND OUTPUT TERMINALS REMOVE THESE LEADS WHEN EXTERNAL SENSE LEADS ARE USED.
2. STORE INTERNAL VOLTAGE LEADS HERE.
3. D-INDICATES LEAD IS A JUMPER.
4. Ⓡ-(STANDARD) INTERNAL VOLTAGE SENSE.
5. Ⓣ-REMOTE VOLTAGE SENSE OPTION.
6. Ⓧ-REMOTE EQUALIZE OPTION.
7. Ⓜ-REQUIRED FOR BATTERY-LESS OPERATION.
8. -VOLTMETER SWITCH DEFEAT- THIS JUMPER IS REQUIRED IN ORDER TO READ BATTERY VOLTAGE WHEN CBI IS IN OFF POSITION.
9. -A LOOP CLOSURE IS REQUIRED TO PLACE RECTIFIER INTO EQUALIZE. (+) BATTERY IS SUPPLIED AT TB3-21 DURING EQUALIZE.

FIGURE FO-12. PP-7699/U RECTIFIER SCHEMATIC.


A
B
C
D
E
F
G
H
1
2
3
4
5
6
TB1
INPUT
380/400/415V
47-63HZ
R
W
BL
Y
O
BR
C11
10
C12
10
C13
10
C8
0.1
C9
0.1
C10
0.1
(A)
(B)
(C)
(D)
(E)
(F)
W-BK C1
J2
CR14
O A7
M6
S1
RELAY
TRIP
A8
PSA
POWER SUPPLY ASSEMBLY
P/O
J1
G4 R8 BL-W
G4 R4 W-BK
K4 ITB3 R
R6 A7 Y
G-W A7 M6
W A7 M6
V A7 M6
F2
F1 Y
K4
T1
S R1 R-W A7 R2
100
Y R6 V-W A7 R2
C22
CR10
1.0
CR4
C18
CR3
A2
P2 A7 BL
BL-W
W-BK
C3
CR9
A5
P2 A7 R
CR7
A4
P2 A7 S
CR8
C24
W-Y R5 Y A7 R2
W-Y R4 W-BK A8 A4
50
C16
CR2
O R9 BR A7 R2
O 100 R8 BL-W A8 A4
CR1
A1
P2 A7 O
BK A7 M6
CR11
A6
P2 A7 BK
V R7 O-W A7 R2
C26
CR12
BL R3 BR-W A7 R2
CR6
C20
CR5
A3
P2 A7 Y-W
W-BK

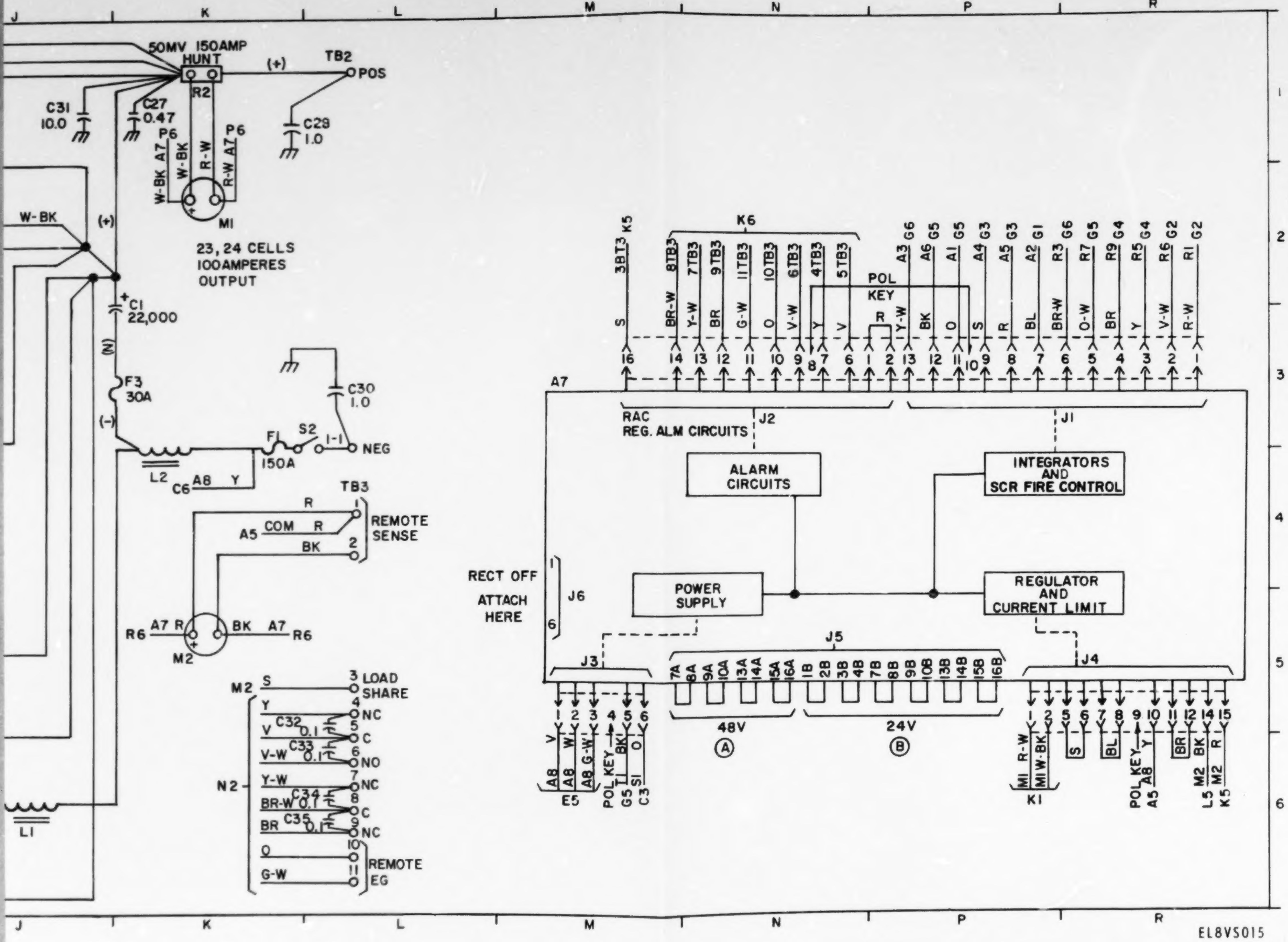
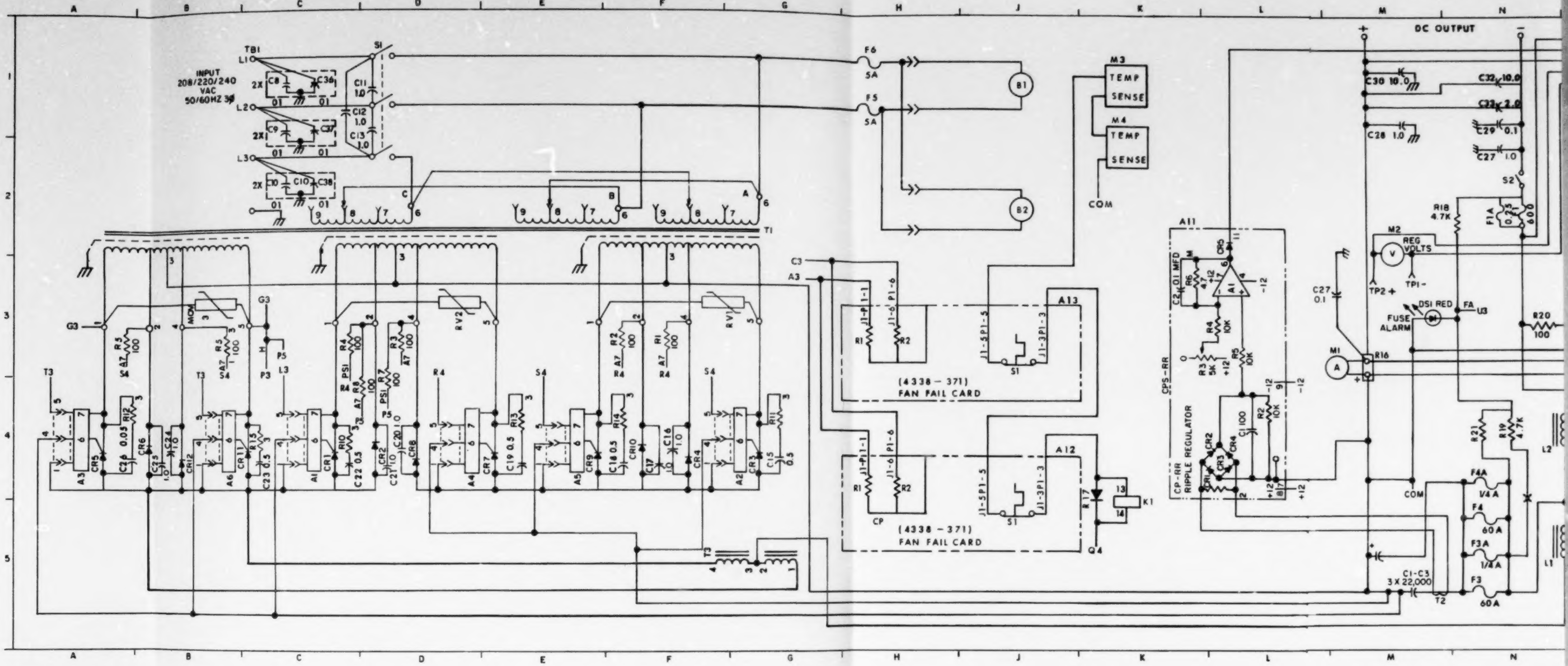
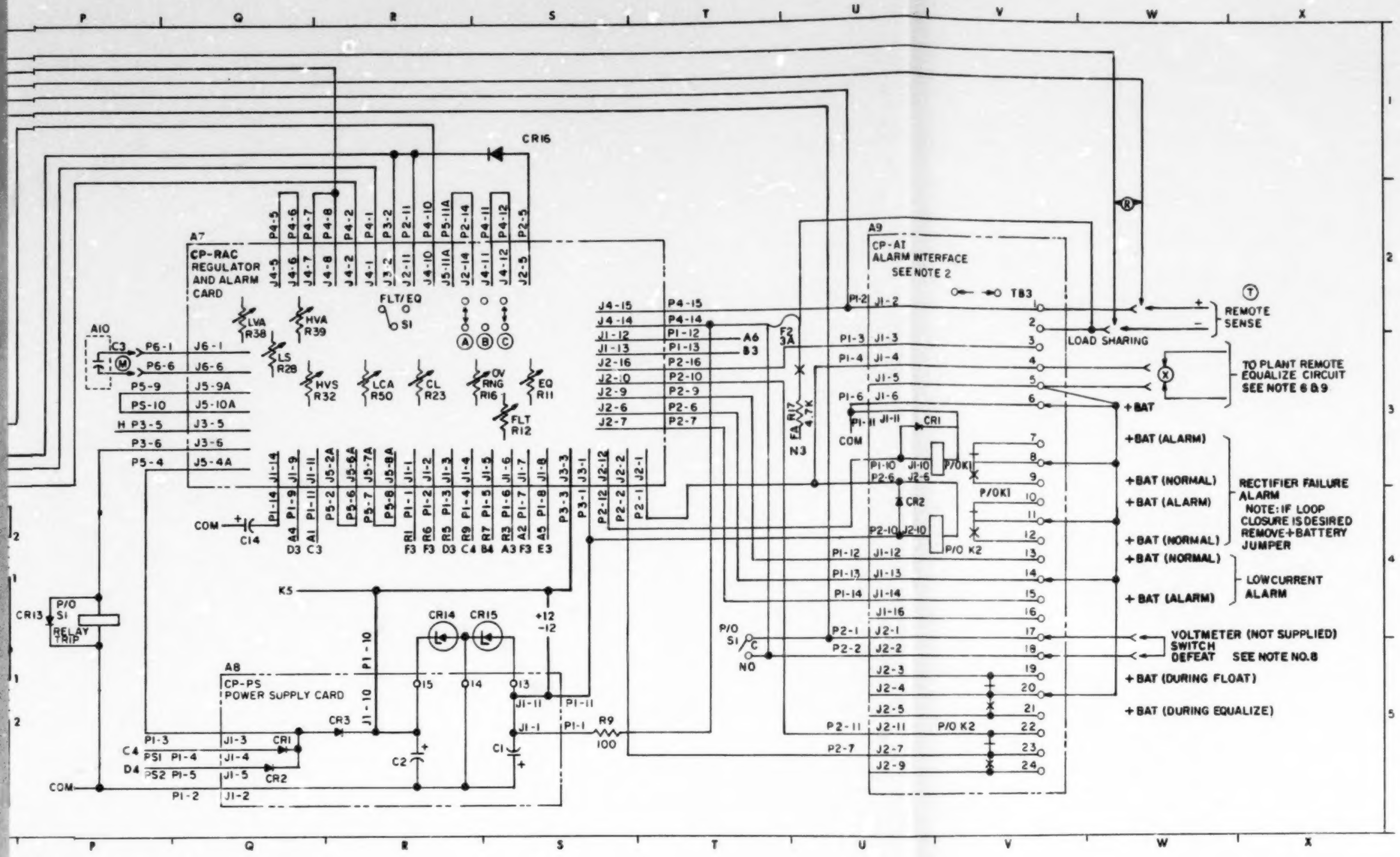

J
K
L
M
N
P
R
1
2
3
4
5
6
50MV 150AMP SHUNT
R2
(+)
TB2
POS
C31 10.0
C27 0.47
C29 1.0
P6
P6
W-BK A7
W-BK
R-W
R-W A7
M1
23, 24 CELLS
100AMPERES
OUTPUT
W-BK
(+)
C1 22,000
(N)
F3 30A
(-)
C30 1.0
F1 150A
S2
1-1
NEG
L2
C6
A8
Y
TB3
R
A5
COM
R
BK
1
2
REMOTE SENSE
R6
A7 R
BK
A7
R6
M2
M2
S
3 LOAD SHARE
Y
4 NC
V
C32 0.1
5 C
V-W
C33 0.1
6 NO
N2
Y-W
7 NC
BR-W
C34 0.1
8 C
BR
C35 0.1
9 NC
O
10
G-W
11
REMOTE EG
L1
K5
K6
3BT3
8TB3
7TB3
9TB3
11TB3
10TB3
6TB3
4TB3
5TB3
A3 G6
A6 G5
A1 G5
A4 G3
A5 G3
A2 G1
R3 G6
R7 G5
R9 G4
R5 G4
R6 G2
R1 G2
POL KEY
S
BR-W
Y-W
BR
G-W
O
V-W
Y
V
R
Y-W
BK
O
S
R
BL
BR-W
O-W
BR
Y
V-W
R-W
16
14
13
12
11
10
9
8
7
6
1
2
13
12
11
10
9
8
7
6
5
4
3
2
1
A7
RAC
REG. ALM CIRCUITS
J2
J1
ALARM CIRCUITS
INTEGRATORS AND SCR FIRE CONTROL
RECT OFF
ATTACH HERE
1
6
J6
POWER SUPPLY
REGULATOR AND CURRENT LIMIT
J3
J5
J4
7A 8A 9A 10A 13A 14A 15A 16A
1B 2B 3B 4B 7B 8B 9B 10B 13B 14B 15B 16B
48V
Ⓐ
24V
Ⓑ
1 2 3 4 5 6
V W G-W POL KEY BK O
A8 A8 A8
E5
G5 T1 S1 C3
1 2 5 6 7 8 9 10 11 12 14 15
R-W W-BK S BL POL KEY Y BR BK R
M1 M1
K1
A8 A5
M2 L5 M2 K5
EL8VS015

FIGURE FO-13. PP-7700/U RECTIFIER SCHEMATIC.


A
B
C
D
E
F
G
H
J
K
L
M
N
1
2
3
4
5
INPUT
208/220/240
VAC
50/60HZ 3Ø
TB1
L1
L2
L3
2X
C8
C36
C9
C37
C10
C38
01
S1
C11
1.0
C12
1.0
C13
1.0
T1
A
B
C
F6
5A
F5
5A
B1
B2
M3
TEMP
SENSE
M4
TEMP
SENSE
COM
DC OUTPUT
+
−
C30 10.0
C32 10.0
C33 2.0
C28 1.0
C29 0.1
C27 1.0
S2
R18
4.7K
F1A
0.25
600
M2
REG
VOLTS
TP2 +
TP1 −
C27
0.1
FUSE
ALARM
DS1 RED
FA
U3
R20
100
M1
A
R16
A11
CR5
C2 .01 MFD
R6
4.7
A1
+12
−12
R4
10K
R3
5K
R5
10K
CPS-RR
C1 100
R2
10K
CP-RR
RIPPLE REGULATOR
CR1
CR2
CR3
CR4
COM
R21
R19
4.7K
L2
L1
F4A
1/4 A
F4
60 A
F3A
1/4 A
F3
60 A
C1-C3
3 X 22,000
T2
C3
A3
A13
A12
J1-P1-1
J1-6 P1-6
J1-5 P1-5
J1-3 P1-3
R1
R2
S1
CP
(4338 − 371)
FAN FAIL CARD
R17
K1
13
14
Q4
G3
R5
100
S4
A7
M10
R3
P5
P3
L3
T3
R4
PS1
R8
R7
RV2
RV1
R2
R1
R12
R13
R14
R11
R15
R10
C26 0.05
CR6
C25
C24
1.0
CR12
CR11
C23 0.5
C22 0.5
C21
CR8
C20 1.0
C19 0.5
CR7
CR9
C18 0.5
CR10
C17
C16 1.0
CR4
CR3
C15 0.5
A6
A4
A5
A2
1
2
3
4
5
6
7
8
9

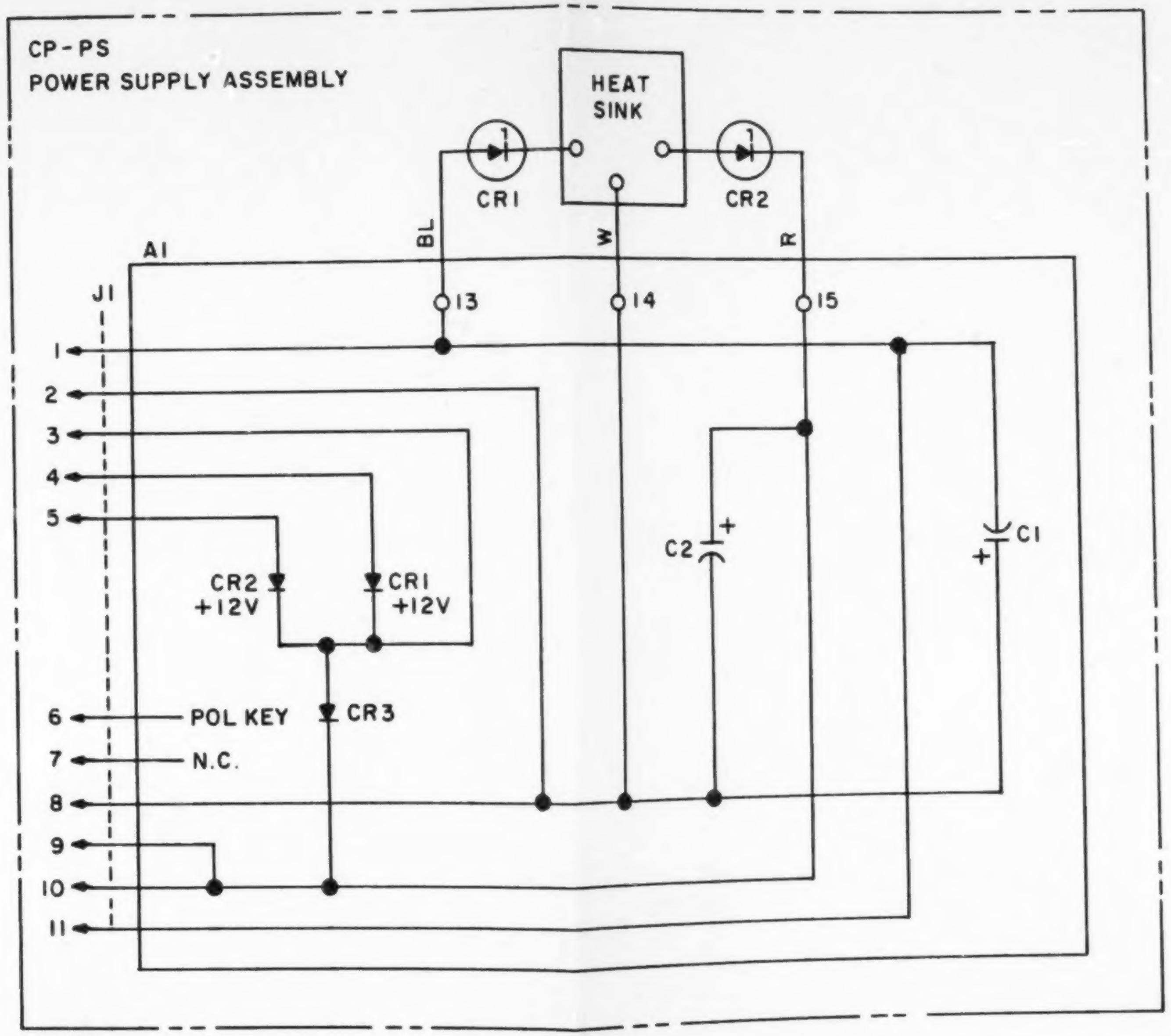

P
Q
R
S
T
U
V
W
X
1
2
3
4
5
CR16
A7
CP-RAC
REGULATOR
AND ALARM
CARD
A10
C3
P6-1
P6-6
P5-9
P5-10
H P3-5
P3-6
P5-4
J6-1
J6-6
J5-9A
J5-10A
J3-5
J3-6
J5-4A
LVA R38
HVA R39
LS R28
HVS R32
LCA R50
CL R23
OV RNG R16
EQ R11
FLT R12
FLT/EQ
S1
A
B
C
COM
C14
K5
CR13
P/O S1
RELAY TRIP
A8
CP-PS
POWER SUPPLY CARD
CR14
CR15
+12
-12
C4
D4
PS1
PS2
P1-3
P1-4
P1-5
P1-2
J1-3
J1-4
J1-5
J1-2
CR1
CR2
CR3
C2
C1
R9
100
J1-10
P1-10
J1-11
P1-11
J1-1
P1-1
A6
B3
F2
3A
R17
4.7K
N3
P/O S1
C
NO
A9
CP-AT
ALARM INTERFACE
SEE NOTE 2
TB3
LOAD SHARING
CR1
CR2
P/O K1
P/O K2
REMOTE SENSE
TO PLANT REMOTE EQUALIZE CIRCUIT SEE NOTE 6 & 9
+BAT
+BAT (ALARM)
+BAT (NORMAL)
+BAT (ALARM)
+BAT (NORMAL)
RECTIFIER FAILURE ALARM
NOTE: IF LOOP CLOSURE IS DESIRED REMOVE+BATTERY JUMPER
+BAT (NORMAL)
+BAT (ALARM)
LOWCURRENT ALARM
VOLTMETER (NOT SUPPLIED)
SWITCH DEFEAT
SEE NOTE NO.8
+BAT (DURING FLOAT)
+BAT (DURING EQUALIZE)

NOTES:

1. EQUIPMENT SUPPLIED WITH INTERNAL VOLTAGE SENSE LEADS BETWEEN TB3 REMOTE SENSE TERMINAL (1) AND (2) AND OUTPUT TERMINALS REMOVE THESE LEADS WHEN EXTERNAL SENSE LEADS ARE USED.
2. STORE INTERNAL VOLTAGE LEADS HERE.
3. D-INDICATES LEAD IS A JUMPER.
4. Ⓡ-(STANDARD) INTERNAL VOLTAGE SENSE.
5. Ⓣ-REMOTE VOLTAGE SENSE OPTION.
6. Ⓧ-REMOTE EQUALIZE OPTION.
7. Ⓜ-REQUIRED FOR BATTERY-LESS OPERATION.
8. -VOLTMETER SWITCH DEFEAT- THIS JUMPER IS REQUIRED IN ORDER TO READ BATTERY VOLTAGE WHEN CBI IS IN OFF POSITION.
9. -A LOOP CLOSURE IS REQUIRED TO PLACE RECTIFIER INTO EQUALIZE. (+) BATTERY IS SUPPLIED AT TB3-21 DURING EQUALIZE.

EL8VS016

FIGURE FO-14 PP-7701/U RECTIFIER SCHEMATIC

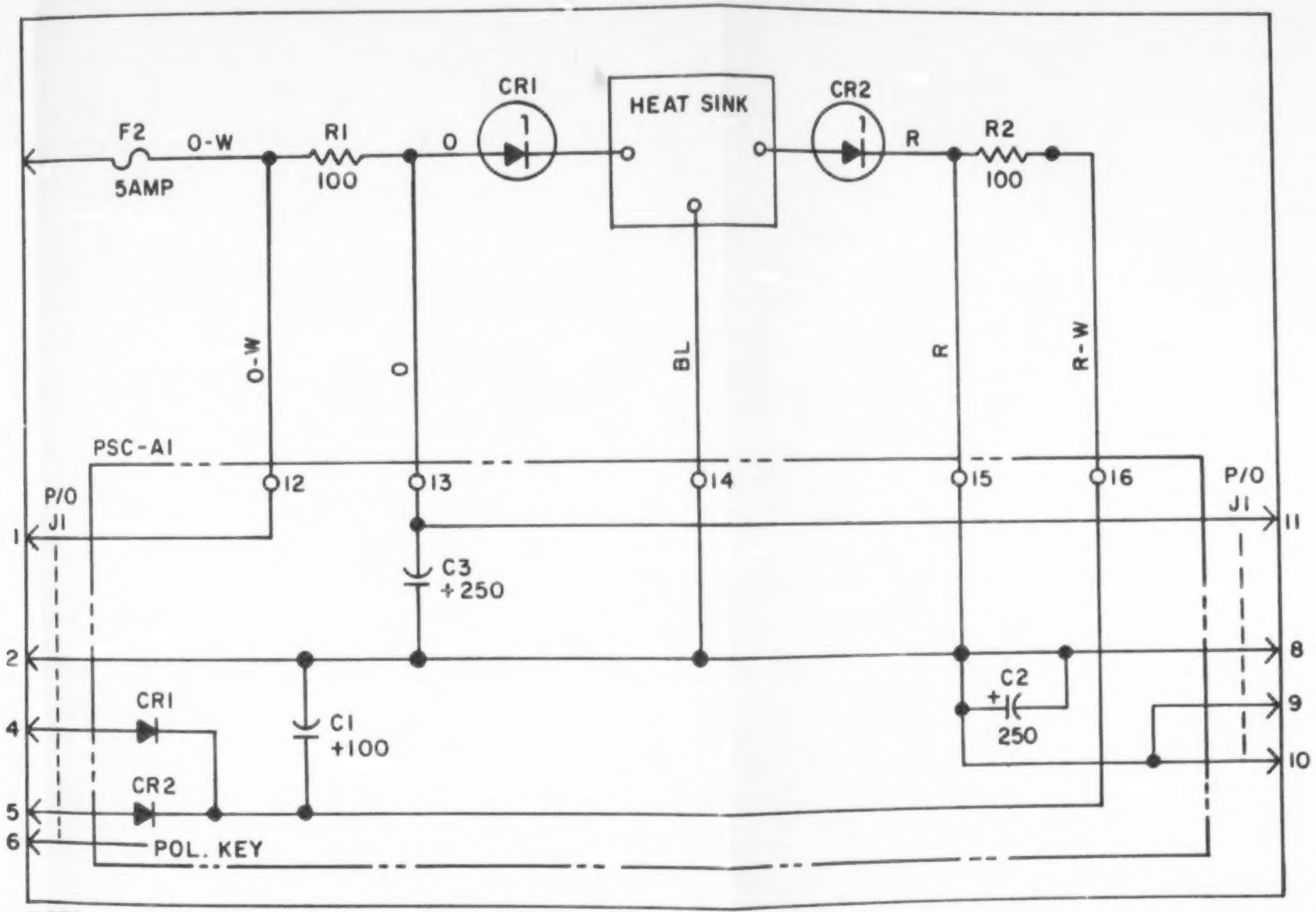

CP-PS
POWER SUPPLY ASSEMBLY
HEAT SINK
CR1
CR2
BL
W
R
A1
J1
13
14
15
1
2
3
4
5
6
7
8
9
10
11
CR2 +12V
CR1 +12V
CR3
POL KEY
N.C.
C2
C1
+

NOTES:

UNLESS OTHERWISE SPECIFIED, CAPACITANCE VALUES ARE IN MICROFARADS.
VALUES PRECEDED BY THE SYMBOL + (PLUS) OR – (MINUS) ARE IN VOLTS.

EL8VS017

FIGURE FO-15. RECTIFIER POWER SUPPLY SCHEMATIC FOR PP-7694/U AND PP-7697/U.

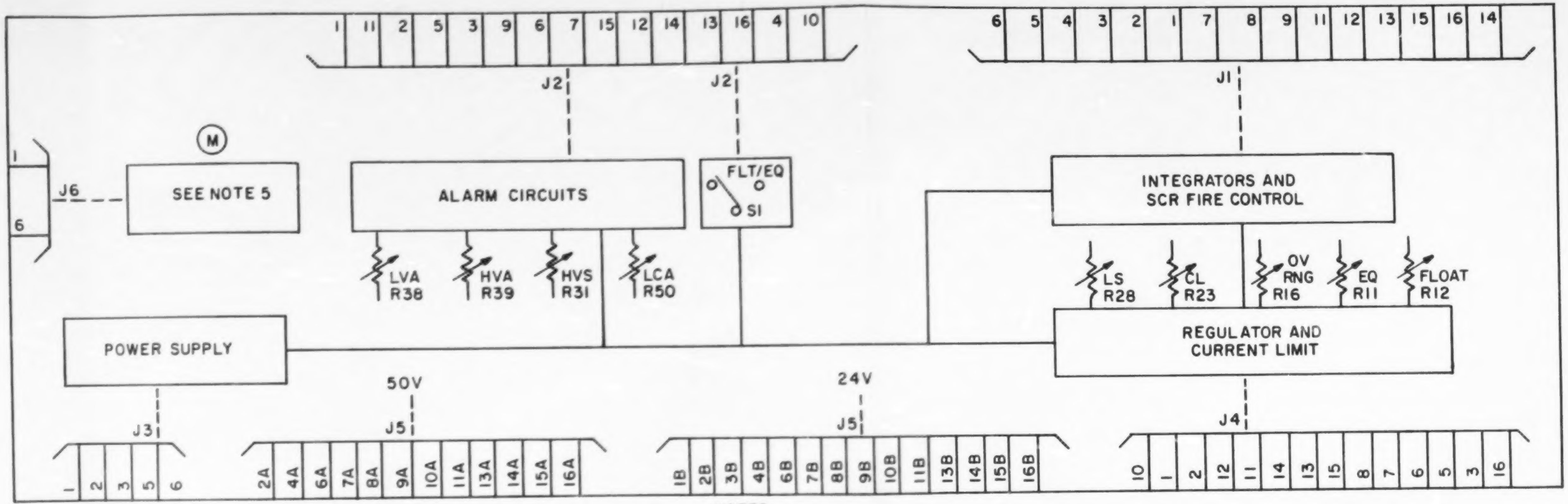

F2
5AMP
O-W
R1
100
O
CR1
HEAT SINK
CR2
R
R2
100
O-W
O
BL
R
R-W
PSC-A1
12
13
14
15
16
P/O
J1
1
2
4
5
6
11
8
9
10
C3
+250
CR1
CR2
C1
+100
C2
250
POL. KEY

NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS. CAPACITANCE VALUES ARE IN MICROFARADS; VALUES PRECEDED BY THE SYMBOL + (PLUS) OR — (MINUS) ARE IN VOLTS.

EL8VS018

FIGURE FO-16. RECTIFIER POWER SUPPLY SCHEMATIC FOR PP-7695/U, PP-7696/U, PP-7698/U, PP-7699/U, PP-7700/U AND PP-7701/U.


1
11
2
5
3
9
6
7
15
12
14
13
16
4
10
J2
J2
6
5
4
3
2
1
7
8
9
11
12
13
15
16
14
J1
M
1
J6
6
SEE NOTE 5
ALARM CIRCUITS
FLT/EQ
S1
INTEGRATORS AND
SCR FIRE CONTROL
LVA
R38
HVA
R39
HVS
R31
LCA
R50
LS
R28
CL
R23
OV
RNG
R16
EQ
R11
FLOAT
R12
POWER SUPPLY
REGULATOR AND
CURRENT LIMIT
50V
24V
J3
J5
J5
J4
1
2
3
5
6
2A
4A
6A
7A
8A
9A
10A
11A
13A
14A
15A
16A
1B
2B
3B
4B
6B
7B
8B
9B
10B
11B
13B
14B
15B
16B
10
1
2
12
11
14
13
15
8
7
6
5
3
16

CIRCUIT DESCRIPTION

THIS CIRCUIT CONTAINS THE REGULATOR AND ALARM CIRCUITRY TO PROVIDE ALL REGULATOR AND ALARM FUNCTIONS FOR ALL 1Ø AND 3Ø RECTIFIERS.

THE REGULATOR CONTAINS VOLTAGE REGULATION CAPABILITY AND CURRENT LIMIT CIRCUITRY.

THE ALARMS CONSIST OF (A) HIGH VOLTAGE ALARM (B) LOW VOLTAGE ALARM. (C) LOW CURRENT ALARM & (D) HIGH VOLTAGE SHUTDOWN.

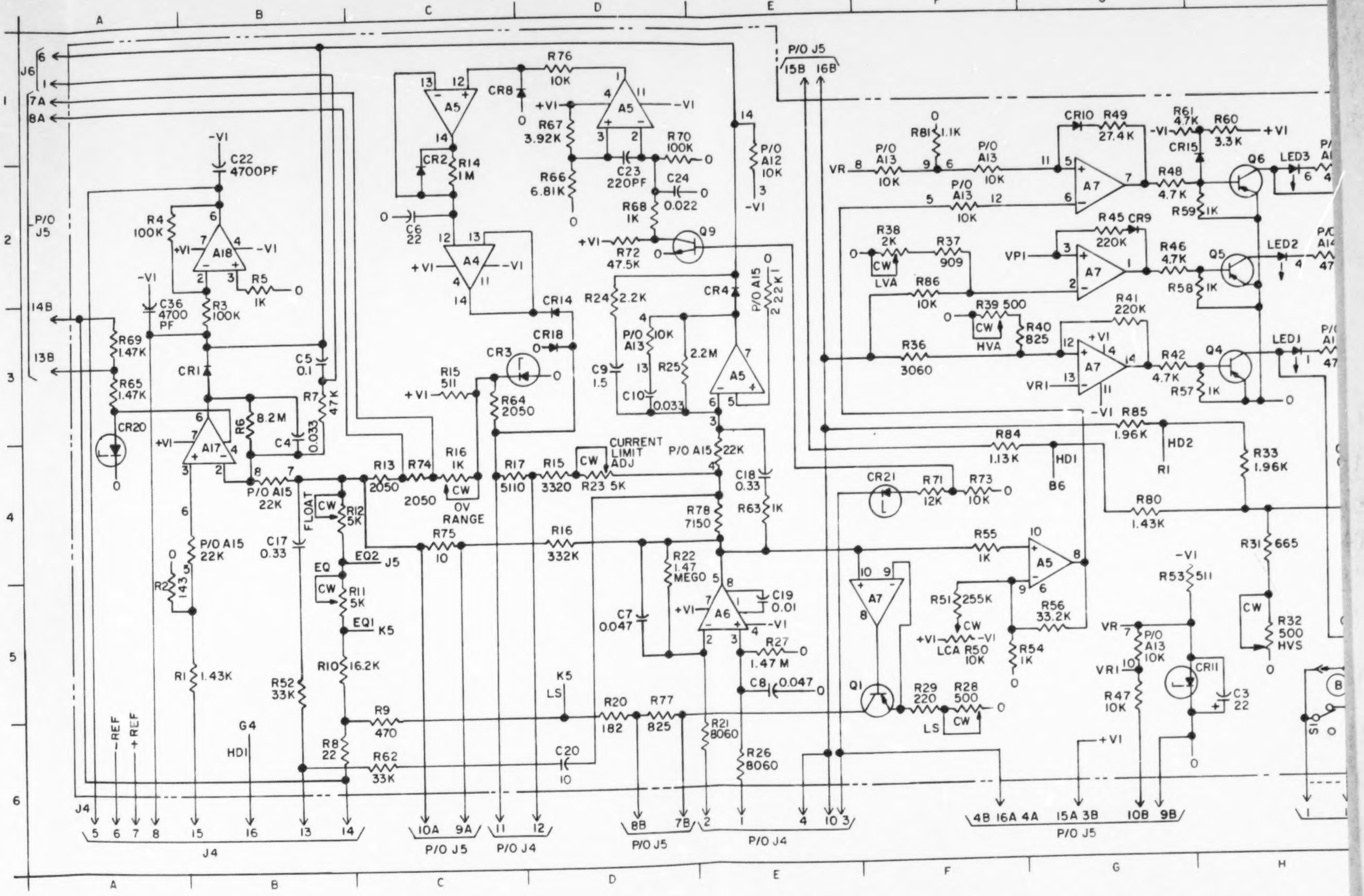
THE VOLTAGE RANGES OF THE ALARMS AND REGULATOR ARE SELECTED WITH AN EXTERNAL PROGRAM PLUG (J5) AND A SELECTED RESISTOR NETWORK A9. TERMINALS OF J5A ARE USED WITH 24V RECTIFIERS.

NOTES:

1. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE IN OHMS. CAPACITANCE VALUES ARE IN MICROFARADS. VALUES PRECEDED BY THE SYMBOL + (PLUS) OR – (MINUS) ARE IN VOLTS.
2. Ⓐ JUMPER IS REMOVED IN PP-7700/U.
3. Ⓑ JUMPER (STANDARD) IS FOR CIRCUIT FLEXIBILITY.
4. Ⓒ JUMPER (STANDARD) IS FOR SELECTIVE HIGH VOLTAGE SHUTDOWN.(REMOVAL WILL DEFEAT SELECTIVE HV)
5. Ⓜ OFF BATTERY CAPACITOR ASSEMBLY OPTION.

EL8VS019

FIGURE FO-17. RECTIFIER REGULATOR AND ALARM CIRCUIT. (SHEET 1 OF 2)



A
B
C
D
E
F
G
H
1
2
3
4
5
6
J6
6
1
7A
8A
P/O J5
14B
13B
C22 4700PF
-VI
R4 100K
A18
R5 1K
R3 100K
C36 4700 PF
R69 1.47K
R65 1.47K
CR1
CR20
A17
R6 8.2M
C4 0.033
C5 0.1
R7 47K
P/O A15 22K
R2 143
R1 1.43K
A5
A4
CR2
R14 1M
C6 22
CR8
R76 10K
R67 3.92K
R66 6.81K
C23 220PF
R70 100K
C24 0.022
R68 1K
Q9
R72 47.5K
P/O A12 10K
CR14
CR18
CR3
R15 511
R64 2050
R13 2050
R74 2050
R16 1K
0V RANGE
R17 5110
R15 3320
R23 5K
CURRENT LIMIT ADJ
CW
FLOAT
R12 5K
C17 0.33
EQ
EQ2 J5
R11 5K
EQ1 K5
R10 16.2K
R52 33K
R9 470
R8 22
R62 33K
C20 10
K5
LS
R20 182
R77 825
R75 10
R16 332K
R24 2.2K
P/O A13 10K
R25 2.2M
C9 1.5
C10 0.033
CR4
P/O A15 2.22K
P/O A15 22K
C18 0.33
R63 1K
R78 7150
R22 1.47 MEGO
C7 0.047
A6
C19 0.01
R27 1.47 M
C8 0.047
R21 8060
R26 8060
G4
HD1
-REF
+REF
J4
P/O J5
15B
16B
VR
P/O A13 10K
R81 1.1K
A7
CR10
R49 27.4K
R61 4.7K
R60 3.3K
+VI
CR15
R48 4.7K
R59 1K
Q6
LED3
R38 2K
LVA
R37 909
VP1
R45 220K
CR9
R46 4.7K
Q5
R58 1K
LED2
R86 10K
R39 500
HVA
R40 825
R41 220K
R36 3060
VR1
R42 4.7K
Q4
R57 1K
LED1
R85 1.96K
HD2
R1
R84 1.13K
HD1
B6
R33 1.96K
CR21
R71 12K
R73 10K
R80 1.43K
R55 1K
R31 665
R51 255K
LCA R50 10K
R56 33.2K
R54 1K
R53 511
R32 500 HVS
Q1
R29 220
R28 500
P/O A13 10K
R47 10K
CR11
C3 22
S1
4B 16A 4A
15A 3B
10B 9B
10A 9A
P/O J4
8B 7B

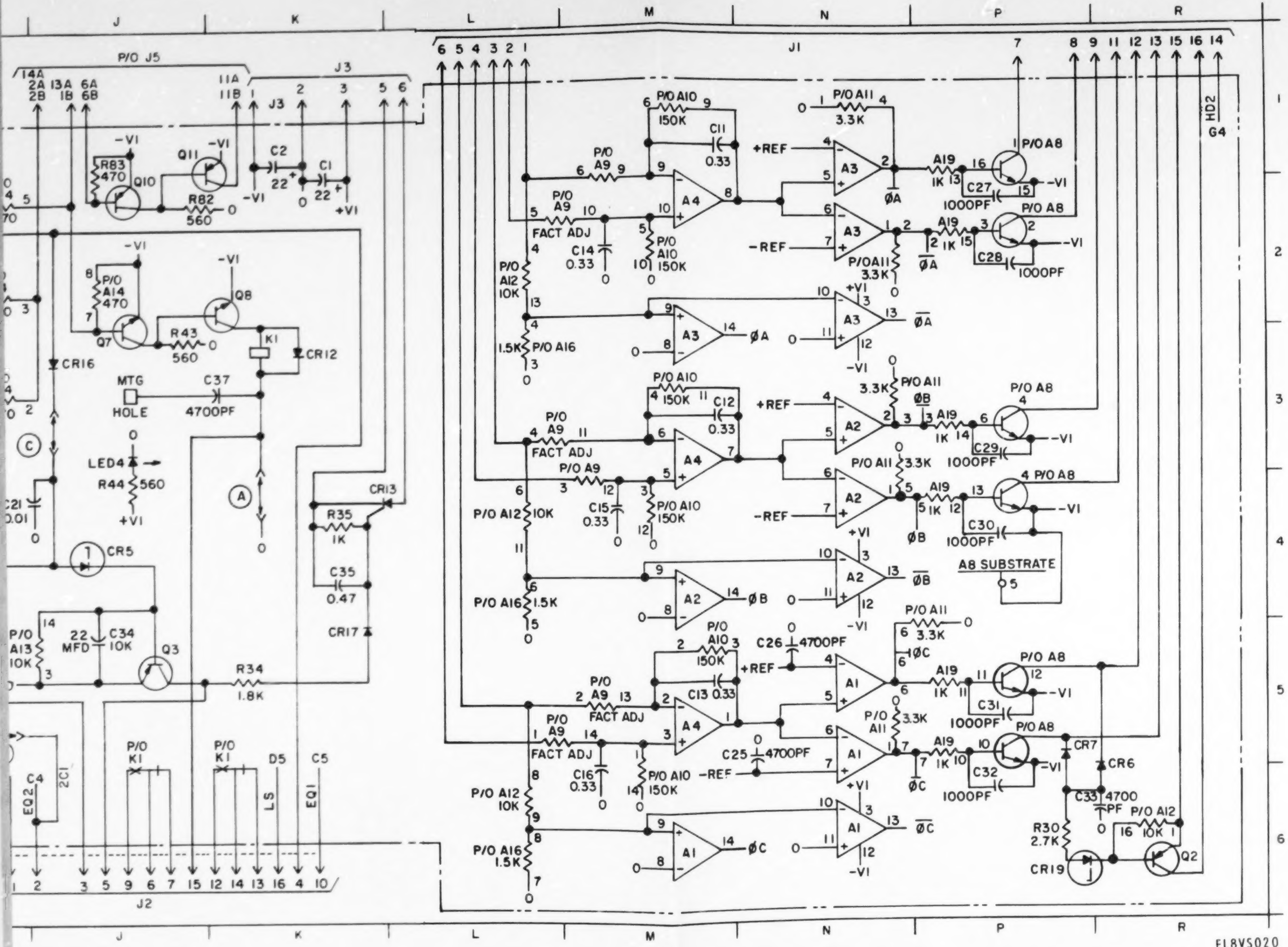
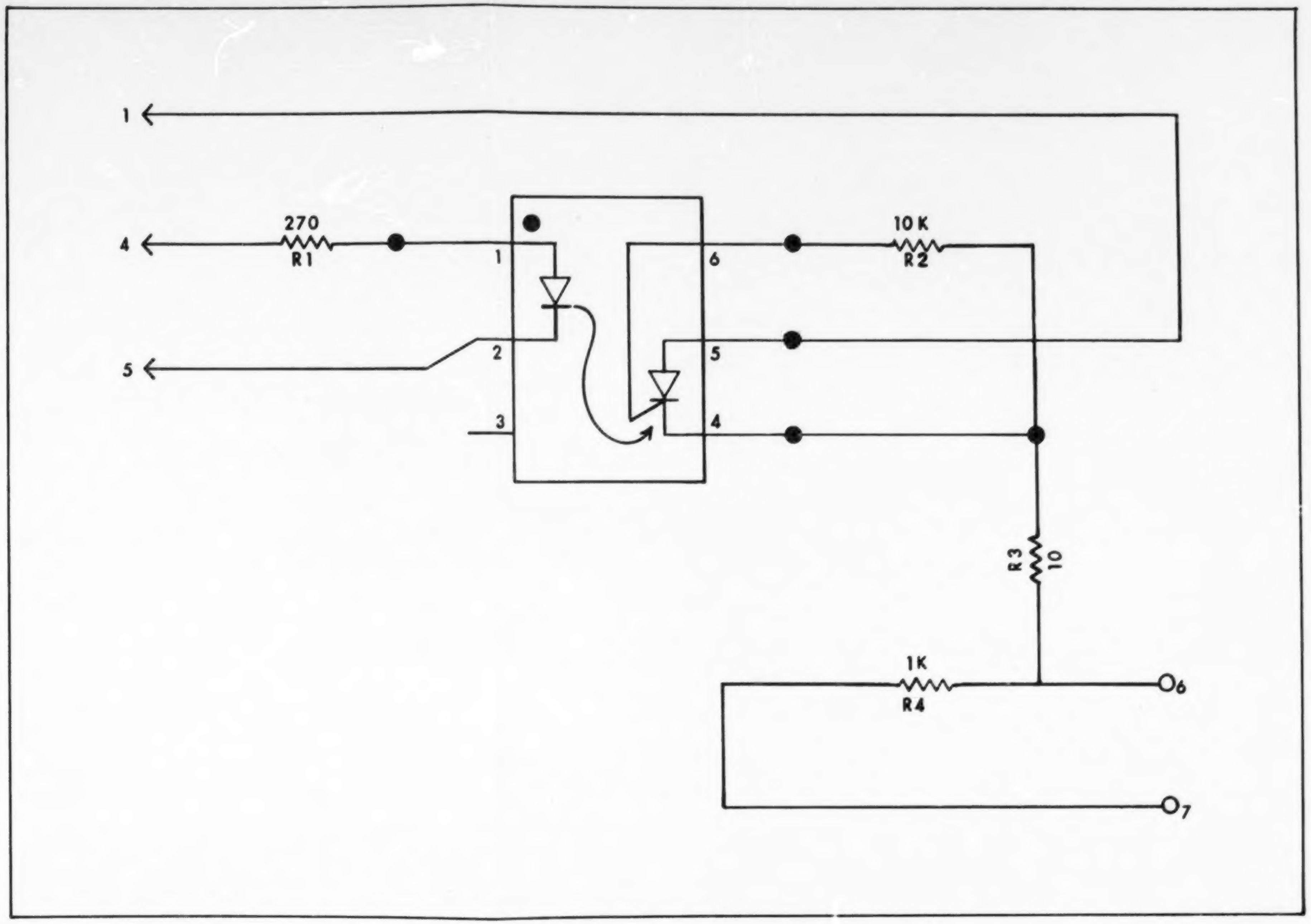

J
K
L
M
N
P
R
1
2
3
4
5
6
P/O J5
J3
J1
J2
HD2
G4
14A
2A 2B
13A 1B
6A 6B
11A 11B
-VI
+VI
R83 470
Q10
Q11
R82 560
C2 22
C1 22
P/O A14 470
Q7
Q8
R43 560
K1
CR12
CR16
MTG HOLE
C37 4700PF
LED4
R44 560
CR13
R35 1K
C35 0.47
CR17
C21 0.01
CR5
P/O A13 10K
22 MFD
C34 10K
Q3
R34 1.8K
C4
EQ2
2C1
P/O K1
D5
LS
C5
EQ1
P/O A10 150K
C11 0.33
P/O A9
FACT ADJ
C14 0.33
P/O A12 10K
P/O A16 1.5K
A4
A3
A2
A1
+REF
-REF
P/O A11 3.3K
A19 1K
P/O A8
C27 1000PF
C28 1000PF
ØA
ØB
ØC
C12 0.33
C15 0.33
C29 1000PF
C30 1000PF
A8 SUBSTRATE
C13 0.33
C16 0.33
C26 4700PF
C25 4700PF
C31 1000PF
C32 1000PF
CR7
CR6
C33 4700 PF
P/O A12 10K
R30 2.7K
CR19
Q2
EL8VS020

FIGURE FO-17. RECTIFIER REGULATOR AND ALARM CIRCUIT. (SHEET 2 OF 2)


1
4
5
270
R1
1
2
3
6
5
4
10 K
R2
R3
10
1K
R4
6
7

EL8VS021

FIGURE FO-18. RECTIFIER TRIGGER BOARD SCHEMATIC.